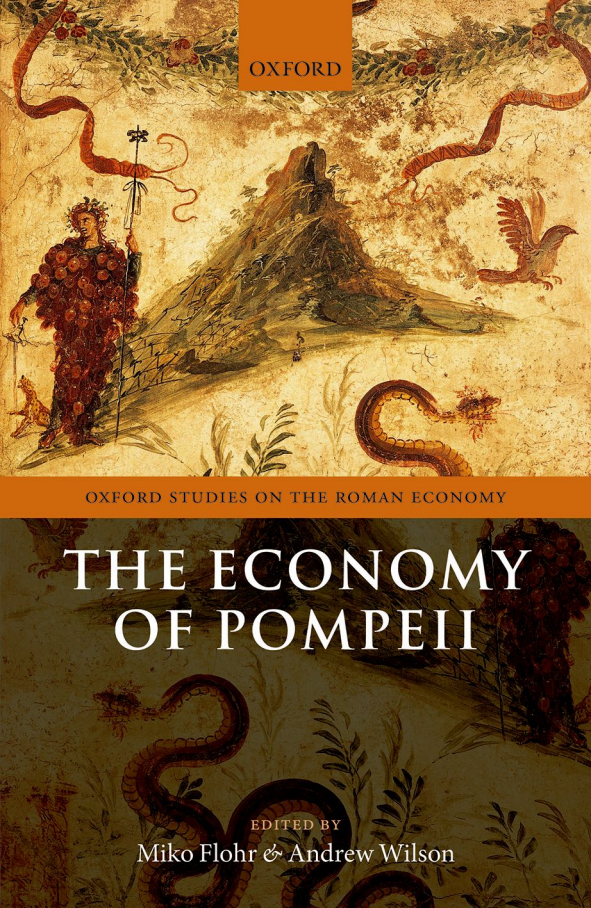


The background of the book cover is a reproduction of a Roman fresco from the Villa of the Papyri in Herculaneum. It depicts a landscape with a central mountain, a river, and various figures. On the left, a woman is draped in a garland of grapes and holds a bunch of grapes on a long pole. A small dog is at her feet. On the right, a bird flies in the sky. In the foreground, a large snake is coiled on the ground. The fresco is painted in earthy tones of ochre, red, and brown.

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THE ECONOMY OF POMPEII

EDITED BY

Miko Flohr & Andrew Wilson

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The Economy of Pompeii

Edited by

MIKO FLOHR

and

ANDREW WILSON

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Preface

Pompeii is perhaps the most studied archaeological site of the Roman world, and it features prominently (perhaps, sometimes, too prominently) in handbooks on Roman art, archaeology, and urbanism. Indeed, there are few aspects of Roman urban history that do not, at some point, lead scholars and students to the ruined city on the Bay of Naples: Pompeii is our default Roman city, and the place one may find evidence for almost any debate in Roman history in quantities and of a quality unmatched elsewhere. Yet while there is no lack of scholarly discourse on the archaeology and history of Pompeii, there has been relatively little debate specifically on Pompeii's economic history, and the recent upsurge of interest in the study of the Roman economy has largely bypassed the city. The present volume aims to contribute to changing this: rather than offering a definitive account of the Pompeian economy, it aims to connect ongoing developments in Pompeian studies to ongoing debates about Roman economic history, and reignite debate on what the thorough study of individual cities can add to our understanding of the Roman economy.

This volume stems from a conference organized by the Oxford Roman Economy Project, which took place at All Souls College and the Ioannou Centre for Classical and Byzantine Studies in Oxford on 29 and 30 June 2012. This brought together specialists in Pompeian studies and specialists in Roman economic history from all over the world to discuss how recent developments in Pompeian archaeology and in the debate about the Roman economy had changed our insight into Pompeii's economic history compared to the late 1980s, when Wim Jongman wrote his monograph on *The Economy and Society of Pompeii*. With one exception, all chapters stem from papers given at that conference. We are very happy that we were able to add Domenico Esposito's contribution on the economy of wall painting, which had been presented at an earlier occasion, to this volume. We regret that a busy schedule kept Philippe Borgard from contributing to the present volume, as his work on Pompeii's textile workshops has been fundamental to debates about Pompeii's manufacturing economy.

The editors wish to thank Baron Lorne Thyssen for his continuing support of the Oxford Roman Economy Project, without which this conference would have been impossible. A major contribution to the costs of the conference was provided by the scientific research network Structural Determinants of Economic Performance in the Roman World, funded by the Research Foundation Flanders, and we thank Koenraad Verboven for making this

possible. We are grateful to All Souls College and the Faculty of Classics for hosting the conference, and to All Souls College and Brasenose College for providing accommodation for the speakers.

Journal abbreviations in this volume follow the style of *L'Année philologique*.

Miko Flohr and
Andrew Wilson

January 2016

Contents

<i>List of Figures</i>	ix
<i>List of Tables</i>	xiii
<i>List of Contributors</i>	xv
Introduction: Investigating an Urban Economy <i>Miko Flohr and Andrew Wilson</i>	1
I. CITY AND HINTERLAND	
1. The Agricultural Economy of Pompeii: Surplus and Dependence <i>Girolamo Ferdinando De Simone</i>	23
2. Quantifying Pompeii: Population, Inequality, and the Urban Economy <i>Miko Flohr</i>	53
II. QUALITY OF LIFE	
3. Consumer Behaviour in Pompeii: Theory and Evidence <i>Nick M. Ray</i>	87
4. Sewers, Archaeobotany, and Diet at Pompeii and Herculaneum <i>Erica Rowan</i>	111
5. Skeletal Remains and the Health of the Population at Pompeii <i>Estelle Lazer</i>	135
III. ECONOMIC LIFE AND ITS CONTEXTS	
6. Measuring the Movement Economy: A Network Analysis of Pompeii <i>Eric Poehler</i>	163
7. Urban Production and the Pompeian Economy <i>Nicolas Monteix</i>	209
8. Wealthy Entrepreneurs and the Urban Economy: Insula VI 1 in its Wider Economic Contexts <i>Damian Robinson</i>	243

9. The Economics of Pompeian Painting 263
Domenico Esposito

IV. MONEY AND TRADE

10. Re-evaluating Pompeii's Coin Finds: Monetary Transactions
 and Urban Waste in the Retail Economy of an Ancient City 293
Steven J. R. Ellis
11. Bes, Butting Bulls, and Bars: The Life of Coinage at Pompeii 339
Richard Hobbs
12. Currency and Credit in the Bay of Naples in the First
 Century ^{AD} 363
Koenraad Verboven
13. Conflicts, Contract Enforcement, and Business Communities
 in the Archive of the Sulpicii 387
Wim Broekaert

V. DISCUSSION

14. Pompeii Revisited 417
Willem Jongman
- Index* 429

List of Figures

1.1 Hypothetical reconstructions of the Somma-Vesuvius complex before the AD 79 eruption	25
1.2 Reconstruction of the Pompeian countryside	26
1.3 Archaeological map of the environs of Vesuvius	28
1.4 Archaeological map of the northern slopes of Mount Vesuvius with 100 <i>iugera</i> circles around each site	29
2.1 Plan of houses VII 1, 25 and VII 1, 46	59
2.2 Plan of the Casa del Fauno	66
2.3 Plan of the Casa del Poeta Tragico	67
2.4 Thiessen polygon indicating Pompeii's natural economic hinterland	70
2.5 Rank-size graph of Pompeii's inhabitable units	73
2.6 Lorenz curves of Pompeii's inhabitable units based on surface and room number	76
2.7 Spread of atria over Pompeii's inhabitable units	76
2.8 Spread of the peristyle over Pompeii's inhabitable units	77
2.9 Spread of one- or two-sided colonnades over Pompeii's inhabitable units	78
2.10 Casa del Poeta Tragico, <i>oecus</i> 15: picture of Theseus abandoning Ariadne	79
2.11 Spread of panel-pictures over Pompeii's inhabitable units	80
3.1 Variation in ceramic vessel types relating to house size	95
3.2 Occurrence of OV by material in relation to CV	96
3.3 Other vessel occurrence in assemblages by material	97
3.4 Jugs by material	98
3.5 Correspondence analysis biplot of vessel form for 'occupied houses'	100
3.6 Discretionary products matrix	102
3.7 Assembled household items by discretionary expenditure	103
4.1 Plan of the Cardo V sewer	113
4.2 Excavation quadrants within the Cardo V sewer	120
4.3 Ubiquity of the mineralized material from the Cardo V sewer	122
5.1 Skeletons in the Terme del Sarno (VII, ii, 17) collection	138
5.2 Bones stored in the Terme del Sarno (VII, ii, 17) were sorted into piles of left and right bones for each skeletal element	140
5.3 Frequency histogram of maximum femur length of the Pompeian sample	144

5.4 Healed fracture of a right femur with associated osteomyelitic lesions in the form of sinuses on the bone surface	145
5.5 Healed depressed fracture of a skull, which involved the left parietal bone	145
5.6 An apparent case of DISH observed on adjacent thoracic vertebrae	149
5.7 View through the foramen magnum of a skull displaying extensive HFI	151
6.1 Pompeian street names	164
6.2 Occurrences of doorways at Pompeii	169
6.3 Occurrences of doorways at Pompeii	172
6.4 Occurrences of doorways at Pompeii, detail	174
6.5 Depth from gates at Pompeii	176
6.6 Doorway occurrences with Depth 2 from gates	179
6.7 Street network of Pompeii	181
6.8 Doorway densities, excavated areas	183
6.9 Doorway densities, excavated and extrapolated areas	184
6.10 Network of excavated and extrapolated doorways and streets at Pompeii	187
6.11 Intensity of movement through the network; all paths to the Temple of Apollo	188
6.12 Total intensity of movement through the network; aggregation of all paths to all locations	189
6.13 Street segments with the greatest movement intensity	194
6.14 Street segments with the least movement intensity	195
7.1 Chronology of the excavations in Pompeii	214
7.2 Distribution of productive spaces 'in AD 79'/known productive spaces after the exhumation of Pompeii	218
7.3 Variations in counting so-called <i>officinae lanificariae</i>	221
7.4 Pompeii, 1973. Sheep grazing at Porta Vesuvio	225
7.5 House I 8, 14, with the two find locations of tool sets	227
7.6 Tool sets found in I 8, 14	229
7.7 Visualization of part of the <i>système technique</i> in which a Pompeian bakery was involved	234
8.1 The frontage of the Casa del Fauno and the economic properties integrated into the Nocera tuff frontage	246
8.2 Insula VI 1 at the time of the eruption in AD 79	248
8.3 The villa at San Rocco in Francolise c.AD 50	251
8.4 The outdoor <i>triclinium</i> of the inn	256

8.5 The bar at VI 1, 5, with its counter orientated to attract customers on the Via Consolare travelling towards the Porta Ercolano	257
8.6 The remains of workshops underlying the Shrine to the Lares Augusti	258
9.1 Kerch sarcophagus: depiction of a painter at work	265
9.2 <i>Pictura ligneis formis inclusa</i> (Herculaneum, apartment V, 18)	267
9.3 Villa dei Papiri. Room I on the first lower level of the <i>basis villae</i> : carbonized remains of scaffolding	269
9.4 Villa dei Papiri. Room I on the first lower level of the <i>basis villae</i> : unfinished decoration	269
9.5 Pompeii, Casa dei Pittori al Lavoro, room 12, east wall, sinopia of architectural frames	270
9.6 Pompeii, Casa dei Pittori al Lavoro, room 12, north wall: unfinished panel picture	270
9.7 Pompeii, Casa dei Pittori al Lavoro, room 12, north wall: unfinished decoration	271
9.8 Pompeii, Casa dei Pittori al Lavoro, room 12	276
9.9 Pompeii, Casa dei Vettii, atrium. Same motif executed by two different painters	278
9.10 Pompeii, Casa dei Vettii: two mythological panels realized by the two principal decorators of the Vettii workshop	279
9.11 Top: Temple of Isis, <i>porticus</i> 1: detail of the frieze with garlands of acanthus. Bottom: Casa di P. Vedius Siricus, <i>exedra</i> 10: detail of the frieze with garlands of acanthus	284
10.1 <i>Insulae</i> VIII 7 (left) and I 1 under excavation by the University of Cincinnati	295
10.2 The location of trenches at VIII 7 and I 1	301
10.3 The total number of coins recovered from each trench	304
10.4 The distribution of AD 79 coin finds across VIII 7 and I 1	310
10.5 The distribution of stratified coin finds from 'use' contexts	314
10.6 A diagrammatic sketch for how urban waste can be sorted and deposited outside of a fort's walls	317
10.7 The percentage of coins recovered from pre-Augustan, Augustan, and post-Augustan phases	322
10.8 The number of coins recovered from stratified, phased contexts, normalized to thirty-year ranges for each period	322
11.1 Origins of coins in the AAPP assemblage	348
11.2 Bronze coin imported from Ebusus, with figure of Bes on both sides (left); Campanian Ebusus type, with simplified 'rudimentary' figure of Bes (right)	349

11.3	Bronze coin imported from Massalia, with head of Apollo on one side and butting bull with mint name on the reverse (left); local Campanian imitation of the type, with garbled legend above the bull (right)	350
11.4	Local Campanian types, only found at Pompeii	350
11.5	Roman coins from the AAPP excavations	352
11.6	A stone ball excavated in regio VI, insula 1	355
11.7	Density of coins found during excavations in Regio VI, Insula 1	359
14.1	Population and per capita consumption in the Nettuno survey area	422

List of Tables

1.1	Calculation of estate sizes	30
1.2	Estimate of the number of inhabitants for most of the Campanian cities	31
1.3	Estimates of citizens and countrymen of Neapolis, Nola, and Pompeii	32
1.4	Average productivity and estate size according to literary sources and contemporary scholars	36
1.5	Quantification of the maximum production of wine and size of the vineyards	38
1.6	Calculation of the estate sizes and maximum extent of vineyards	38
1.7	Estimate of the annual production of grain and the people potentially fed with it	41
1.8	List of all vegetal remains found in the Vesuvian cities	44
2.1	Entrances along the eastern part of the Via dell'Abbondanza	61
2.2	Reconstructing the missing <i>insulae</i> of Pompeii	62
2.3	Constructing the population estimate	64
2.4	Percentage of the population per building type	72
3.1	Houses in the data population	92
6.1	Association of property type with movement intensity	193
6.2	Extrapolations of visitors to Pompeii by gate and time	199
7.1	Comparison of a selection of productive spaces between 'AD 79' Pompeii and first-century AD Switzerland	226
7.2	Overview of tools found in the atrium and room 9 of house I 8, 14	228
11.1	Summary of coin types represented in the AAPP assemblage	347
11.2	Contextual association of coins from the Massalia and Ebusus-type coins and Republican-cut fractions	354
12.1	Reconstruction of the amount of coins in circulation at Pompeii	368

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Introduction

Investigating an Urban Economy

Miko Flohr and Andrew Wilson

Moses Finley once famously claimed that, because of the quality of the data, attempting to write the history of individual ancient towns was a ‘cul-de-sac’.¹ Instead, he championed the idea that the ancient city needed to be approached on a conceptual level, so that the role of the city as a ‘pivotal institution’ in the Greco-Roman world could be understood. Several decades of fierce debate about what precisely this role might have been followed Finley’s discussion of the nature of the ancient city. Essentially, however, the most important conclusion emerging from this debate has been that, ultimately, Greco-Roman urbanism was too varied for a conceptual approach to yield historically meaningful results: it was not so much Finley’s theory that ancient cities were Weberian ‘consumer cities’ that was misguided, but rather the idea that a single ideal type was the best approach to understanding Roman urbanism, and particularly Roman urban economies.² In other words, trying to write the history of an individual town, however complicated it is, is not a cul-de-sac, but an essential part of debating the history of Roman urbanism, and of urban economies in the Roman world.

Indeed, over the past decades, several scholars have examined the economic histories of specific towns in the Roman world, sometimes with significant impact on the debate. In the 1980s and early 1990s, there was the work of Leveau on Caesarea, Jongman’s book on the economy and society of Pompeii, and the monograph of Engels on Roman Corinth.³ Around the turn of the millennium, Mattingly and others investigated the economy of Leptiminus, and Wilson those of Sabratha and Timgad.⁴ More recently, there has been

¹ Finley (1977: 325).

² See esp. Mattingly et al. (2000: 81–4); Wilson (2002: 265–6).

³ Leveau (1984); Jongman (1988); Engels (1990).

⁴ Mattingly et al. (2000); Wilson (2002).

further work on Leptiminus,⁵ and the study by Jaschke of the social and economic history of Puteoli.⁶ While these studies have all enriched the debate, it may be observed that most of them were, by choice or necessity, mono-disciplinary in the sense that they approached their case through one dataset, or from one specific theoretical or methodological angle. Often there were also strong echoes of the research agenda set by Finley's provocative model of the consumer city. There have been no efforts to look at one specific city from a variety of perspectives and through several different datasets, even though such an exercise could be of great value, both on a methodological and a historical level: a multidisciplinary effort can highlight how the different aspects of economic history work together in one specific place, and may result in a detailed understanding that cannot easily be achieved through other means. At the same time, such an effort may foster historical, theoretical, and methodological debate that may inform approaches of scholars focusing on urban economies elsewhere in the Roman world.

Pompeii is perhaps the best possible place to do this. There can be little doubt that the remains of Pompeii and, to a lesser extent, Herculaneum, present a uniquely rich body of evidence for studying key aspects of Roman urbanism, including anything related to urban economic history. There is no other place in the Roman world whose economic history can be approached from such a variety of angles, including, amongst other things, the everyday urban processes of production, retail, and consumption, their historical development over time, the use of money and the sophistication of the local financial system, the functioning of a city and its regional environment within the wider Mediterranean trade system, and the effects of a city's economic performance on the prosperity of the urban population.

The present volume aims to bring together a variety of approaches to the economic history of Pompeii. This is, strangely enough, no superfluous exercise: despite the quality of the evidence discovered in Pompeii and the region destroyed by the AD 79 eruption of Mount Vesuvius, it may be argued that the city—and especially its archaeological remains—has so far contributed only to a very limited extent to debates about Roman economic history. Even in the vibrant 'consumer-city debate' of the 1980s and 1990s, the city played a much more modest role than perhaps could have been expected: Jongman's radically primitivist reading of the city's economy failed to provoke any serious response from archaeologists who were familiar with the Pompeian evidence—there was little debate about economic history among Pompeian scholars at the time, and scholars working on urban economic history in the Roman world generally worked with evidence from outside Italy.⁷ This has not really

⁵ Mattingly et al. (2011). ⁶ Jaschke (2010).

⁷ Jongman (1988). Significantly, most scholars reviewing the book were generalists; none of them was an archaeologist, or seems to have had specialist knowledge of Pompeii's material

changed over the last ten years. Of course, the city is frequently mentioned in scholarly literature on the Roman economy, but often only briefly, in passing, mostly when some individual piece of evidence from the site is brought forward in support of some particular argument.⁸ For instance, the discovery of many agricultural tools in the city has recently been used to support the idea that many urban residents in the Roman world were directly engaged in agriculture.⁹ Similarly, archaeobotanical finds from Pompeii have been used to argue in favour of a substantial Roman spice trade.¹⁰ However, these brief references appear decontextualized: generalists using Pompeian evidence do not tend to show much consideration for the particular historical background within which the Pompeian evidence was originally produced. Indeed, in many cases, Pompeii still seems to be used as an exceptionally well-preserved, but ultimately more-or-less average Roman city—an ideal source for vivid anecdotes of how things worked in ‘the Roman economy’.

Things, of course, were not so simple. Like any city, Pompeii was a very specific place, shaped by the unique geographic, historical, and ecological peculiarities of its regional environment, and it is only through a critical understanding of the way in which these circumstances shaped the Pompeian evidence that it becomes possible to understand the economic history of the city, and to assess the relevance of the Pompeian evidence for wider debates about Roman economic history. As will be emphasized throughout this volume, this interpretative process is not at all straightforward, and the Pompeian record is much more complex than it perhaps may seem to be at first sight. Indeed, even with regard to Pompeii, there are significant limits to our knowledge, and these will be exposed in virtually all of the chapters following this Introduction. Still, Pompeii’s unique material and textual record makes it possible to discuss its economic history in a unique level of detail, both regarding the AD 79 situation, and the historical development of the urban economy in the preceding centuries.

The following pages will further introduce the theme of this volume. They will provide an overview of what has been written so far about Pompeii’s economy and economic history, and introduce the various contributions to this volume, before assessing some of the trends emerging, and put them into the context of recent debates about Roman urban economies. First, however, a

evidence. Cf. Banaji (1989); Purcell (1990); Franklin Jr (1990); Frier (1991); Scheidel (1992). On the geographical emphasis of the consumer-city debate see Flohr and Wilson (2016: 35–40).

⁸ In the recent *Cambridge Companion to the Roman Economy*, evidence from Pompeii is mentioned (in passing) only in three chapters: Wilson (2012: 140, 150); Kron (2012: 161, 169); Erdkamp (2012: 246). In the *Cambridge Economic History of the Greco-Roman World*, Pompeii is briefly referred to by Sallares (2007: 31); Schneider (2007: 154, 158, 161, 169); Harris (2007: 532, 539); Kehoe (2007: 565); Morley (2007: 588); Jongman (2007: 616); Leveau (2007: 662); and Cherry (2007: 731).

⁹ Erdkamp (2012: 246).

¹⁰ Kron (2012: 161).

few things may need to be said about Pompeii itself, its regional context, and the nature of its evidence.

INTRODUCING POMPEII

Pompeii was situated close to the sea on a low hill of volcanic origin, overlooking the Sarno estuary. The city has a long history: its oldest visible remains go back to as early as the seventh century BC, but recent excavations have led to the discovery of even older evidence.¹¹ Relatively little, however, is known about the town before the third century BC, and Pompeii's history before the mid-second century BC is the subject of fierce academic debate.¹² The town of AD 79 was decisively shaped by a series of developments, including several phases of intense building activity. The first major building boom of Pompeii is commonly dated in the second half of the second century BC, a period that has been described as Pompeii's 'golden century', and which saw the arrival or emergence of a wealthy urban elite building large urban palaces in the Hellenistic fashion.¹³ The foundation of a Roman colony, in 80 BC, was another major event, and though its immediate effect on the urban economy is not immediately clear, it had major implications for the socio-economic ties between the city and the Roman elite, and, practically, for the legal framework within which economic activity took place.¹⁴ A second period that appears to have brought significant changes to the urban economic landscape is the Augustan period, which not only saw developments around the forum, but also great building activity along the city's through-roads.¹⁵ Finally, the two decades preceding the AD 79 eruption of Mount Vesuvius were characterized by increased seismic activity, including at least two major earthquakes, which have left clearly visible traces in the material remains of Pompeii; the effects of these disasters on the city's economy have been fiercely debated in the past, as will be discussed in the next section ('The Pompeian Economy: A Century of Scholarly Debate'), and in several of the contributions to this volume.¹⁶

Pompeii was surrounded on three sides by fertile and heavily cultivated agricultural land, as is attested by the large number of villas discovered

¹¹ On the early history of Pompeii see the chapters in Ellis (2011), esp. Guzzo (2011); Robinson (2011); Coarelli and Pesando (2011).

¹² See, for instance, the debate about the date of early atrium houses like the Casa del Chirurgo (V 1, 10), the Casa degli Scienziati (VI 14, 43), and the Casa del Naviglio (VI 10, 11). Cf. Peterse and de Waele (2005); De Haan et al. (2005); Coarelli and Pesando (2011: 51).

¹³ For the term see Pesando (2006).

¹⁴ On the Sullan colony see esp. Zevi (1996).

¹⁵ On the Augustan period see also Chapter 10 (this volume).

¹⁶ See esp. Chapter 7 (this volume).

between Pompeii and the southern slopes of Mount Vesuvius. Many of the villas show evidence of mixed farming, with an emphasis on viticulture.¹⁷ However, more important than this rich agricultural hinterland is the fact that Pompeii was extremely well connected. With the shore, already in antiquity, a kilometre or so away from the Porta Marina, Pompeii was not really a coastal town in the most literal sense of the word, but there was a port associated with the city—though its precise location is disputed.¹⁸ Overland, Pompeii was connected by a road along the coast to Naples and Herculaneum, and there were direct roads leading to Nola and Nuceria.¹⁹ The latter two roads also connected with the Via Popilia, which ran from Capua through Nola and Nuceria to Salerno and further to the south until Rhegium.²⁰ This all meant that the harbour of Pompeii could develop a regional function—as is indeed suggested by Strabo, who claimed that the port of Pompeii served Nuceria, Nola, and Acherrae.²¹ Moreover, the presence of a maritime connection also meant that Pompeii could easily maintain close ties with the entire Bay of Naples region, which included cities like Cumae, Misenum, Naples, Surrentum, and, particularly, of course, Puteoli.²² This is the regional context in which Pompeii's economy needs to be understood, as is perfectly illustrated by the Sulpicii archive, which records business practice in Puteoli in the AD 30s, but was found in the immediate vicinity of Pompeii.²³ It is a context which, from the second century BC onwards, increasingly began to be dominated by the Roman elite, who started to build large villas around the Bay of Naples shoreline, and to spend large parts of the year in the region.²⁴

Finally, something needs to be said about the nature of the Pompeian evidence. Pompeii can barely be understood without understanding its complex excavation history, which has a decisive influence on the degree to which evidence actually can be used. Besides the problem, discussed at some length by Monteix in Chapter 7, that the site was buried at a very particular moment in its history, there are three main issues.²⁵ First of all, the variation in preservation strategies employed after excavation means that there are major differences within the site in the state of the standing remains and the degree to which they reveal information about the history and use of buildings—certain types of evidence have survived in some parts of the town, but not in

¹⁷ Oettel (1996); Moormann (2007).

¹⁸ The archaeological evidence discovered between Pompeii and the sea is discussed in Stefani and Di Maio (2003). On the location of the harbour of Pompeii see also, unconvincingly, Curti (2008).

¹⁹ On the road between Pompeii and Nuceria see De'Spagnolis Conticello (1994).

²⁰ Cf. *CIL* 1.6950.

²¹ Strabo, *Geogr.* 5.4.8.

²² On Puteoli see Tuck (2012); Jaschke (2010).

²³ It is unclear how the archive actually ended up at Murecine. See, on the context of its discovery, Camodeca (1992: 5–6).

²⁴ D'Arms (1970).

²⁵ Chapter 7 (this volume).

others. Secondly, abysmal recording of movable objects and loose finds for most of Pompeii's excavation history enormously complicates our view on many everyday social and economic processes, as is clear from the work of Penelope Allison on Pompeii's domestic assemblages.²⁶ Thirdly, there is the problem that only a very limited part of the city has been stratigraphically excavated below the AD 79 floor and ground levels, while there is debate about the reliability of evidence like construction materials and techniques for dating buildings, particularly before the second century BC.²⁷ Even though the situation has improved considerably over the last two decades, this means that the large majority of what is visible at Pompeii is particularly revealing about the last decades of the town's existence, and tells us much less about what happened earlier.²⁸ Nevertheless, Jongman was unduly pessimistic when he considered Pompeii 'unsuitable for dynamic analysis' and described it as 'a necessarily static cross-section at more or less one moment in time': many things can be said about Pompeii's economic history, but one necessarily has to extrapolate from a limited, and not necessarily representative, amount of observations.²⁹

THE POMPEIAN ECONOMY: A CENTURY OF SCHOLARLY DEBATE

The nature of the Pompeian economy has been debated since the early twentieth century. Highly influential—initially—was Tenney Frank's discussion of Pompeii's economic life, which first appeared in 1918 in *Classical Philology*, and was later reprinted almost verbatim in his 1927 *Economic History of Rome*.³⁰ Frank sketched a vivid picture of manufacturing and retail in Pompeii, examining food and textile industries, and agriculture. He argued that, although the Pompeian economy was dominated by entrepreneurs operating on a small scale, industries 'appear in all stages of development toward capitalistic production', pointing in particular to the presence of bakeries, fulleries, and a tannery operating on a large scale, and to Pompeii's garum industry. A more systematic and detailed account of the Pompeian economy was produced by Helmut Sievers, who, in his dissertation, discusses

²⁶ Esp. Allison (2004).

²⁷ On the excavated area see Coarelli and Pesando (2011: 37). On the use of walls for dating see Ellis (2008) on Peterse (2007).

²⁸ For a more elaborate discussion of this issue see Chapter 7 (this volume).

²⁹ Jongman (1988: 56). In Jongman's defence, though, it has to be noted that our knowledge of Pompeii's past, and our awareness of the site's chronological complexity, have increased dramatically since the mid-1980s, when he wrote his book.

³⁰ Frank (1918; 1927: 245–70).

the evidence for agriculture, manufacturing, and trade.³¹ Though the emphasis of his work is very much on the evidence, and though the book lacks interpretation and a clear conclusion, Sievers mostly followed Frank's emphasis on the scale of some manufacturing establishments, and on the significance of the Pompeian textile industry.³² After the Second World War, the work of Frank would be the starting point for scholars belonging to the group of Wilhelmina Jashemski, who studied specific branches of the Pompeian manufacturing economy in greater detail: Walter Moeller investigated the evidence for textile production at Pompeii, Robert Curtis focused on the garum industry, while Betty Jo Mayeske analysed Pompeii's bakeries.³³ Generally, these works tended to echo the modernist views outlined by Frank, but they were never joined up into a wider picture of the Pompeian economy.

A second important line of thinking about Pompeii's economy started with Amedeo Maiuri, who believed that Pompeii underwent significant socio-economic changes in the years following the AD 62/3 earthquake, leading to the emergence of a class of entrepreneurs and the retirement of the traditional urban elite. While his dramatic picture of the last years of Pompeii is now almost universally rejected, it should not be forgotten that a key contribution of Maiuri, who was one of the very few before the 1990s to excavate underneath the AD 79 floor levels, was his emphasis on the notion of chronological change, something that had been almost completely absent from earlier scholarship.³⁴ Moreover, his idea that the archaeological record of Pompeii does to some extent reflect a city in upheaval rather than a 'normal' situation has—rightly—remained very central to Pompeian scholarship since, albeit on a methodological level.³⁵

The late 1980s and early 1990s arguably marked a watershed in the debate about Pompeii's economy. There was, of course, the pivotal monograph on the city's economy and society by Jongman, which, even though its central argument suffered, at points, from primitivist dogmatism, played a major role in highlighting some of the methodological shortcomings of earlier Pompeian scholarship, and helped to introduce the approaches and models of economic historians to the study of Pompeii. Jongman's work received a mixed reception, and it may be argued that it did not help that he did not really provide a powerful model for making sense of the visible archaeological remains of the city: his analysis mostly focused on Pompeii's epigraphic record.³⁶ More important in their impact on subsequent approaches to Pompeii's economy were the works of Wallace-Hadrill and Laurence, in which these archaeological

³¹ Sievers (1938).

³² See e.g. on bakeries Sievers (1938: 22) and on the textile industry Sievers (1938: 72).

³³ Moeller (1962; 1976); Curtis (1973); Mayeske (1972).

³⁴ Maiuri (1942). See, for a rebuttal, esp. Wallace-Hadrill (1994: 122–31), and Monteix (2010: 3–36).

³⁵ See e.g. Allison (2004). Chapter 7 (this volume).

³⁶ Jongman (1988). See also Chapter 2 (this volume), and Wilson (2002: 234–6).

remains play a much more central role. Wallace-Hadrill offered, in his depiction of Pompeii as a society organized around houses, a powerful vantage point from which to look at the structure of Pompeii's urban economy: the atrium house was not only the focal point of Pompeii's society, but also the pivot around which much of Pompeii's economic life was organized.³⁷ Laurence, while interested more in urban space than in Pompeii's economy, outlined, in a much more refined way than had been done before, the city's economic topography, and gave a rough sketch of Pompeii's commercial landscape.³⁸

It makes sense to group these three monographs together, as they marked a significant departure from 'traditional' approaches to Pompeii, and paved the way for many subsequent approaches to the city's economic life. At the same time, these books also have in common the fact that they antedate the revolution in Pompeian archaeology that started to take place from the late 1990s onwards, when, due to changed policies under the directorship of Pietro Giovanni Guzzo, a large number of research projects started to explore Pompeii in a more or less systematic manner underneath the AD 79 floor levels.³⁹ While not all projects have published their final results, and while few of them were specifically interested in questions about the Pompeian economy, this development has completely changed our view of Pompeii's history and, as a consequence, has also affected our understanding of Pompeii's economic history. Moreover, there have been several projects that have specifically investigated aspects of Pompeii's artisanal economy, and have dramatically improved our knowledge of Pompeii's shops and workshops.⁴⁰ These developments mean that a reassessment of Pompeii's economy and of the significance of its evidence for the Roman economy in general, is timely, and have had a clear impact on the chapters of the present volume.

ABOUT THE PRESENT VOLUME

This volume approaches the Pompeian economy from a variety of perspectives. Whereas traditional emphasis in the study of Pompeii's economy has lain mostly with everyday economic processes like manufacturing, trade, and retail in the city itself, the focus here is predominantly on four other themes.

³⁷ Wallace-Hadrill (1994: 134–42).

³⁸ Laurence (1994); for an earlier approach see Raper (1977).

³⁹ For results of these developments see e.g. Guzzo and Guidobaldi (2005); Coarelli and Pesando (2006); Amoroso (2007); Guidobaldi and Guzzo (2008); Verzar-Bass and Oriolo (2010); Ellis (2011).

⁴⁰ In particular, the project of the Centre Jean Bérard (see esp. Borgard et al. [2003; 2005]), the Cleaning the Laundries Project (Flohr [2007; 2008; 2011]), and the work of Nicolas Monteix and his team on Pompeii's bakeries (Monteix et al. [2012; 2013; 2014]).

Chapters 1 and 2 discuss the position of Pompeii in its regional context, and the economic basis of the patterns of consumption visible in Pompeii's archaeological record. This is followed by three chapters focusing mostly on the outcome side of the economy, and on the way in which Pompeii's economic performance shaped the lives of its population. Part III of the volume looks more at the contexts in which economic life took place—focusing less on the everyday processes, and more on the built environment within which retail and manufacturing occurred. In Part IV, Chapters 10–13 focus on money, trade, and the way in which evidence from Pompeii enables us to understand economic processes in the wider region of the Bay of Naples and beyond. The volume concludes with Chapter 14, by Willem Jongman, on the way in which the arguments presented in this volume alter the picture of the state of Pompeii's economy, and affect ongoing debates about the Roman economy.

City and Hinterland

The first chapter serves to set the scene by giving a broad overview of the agricultural landscape of the Vesuvian region in the first century AD. Discussing the evidence for wine production, cereals, oleiculture, horticulture, and woodland farming in the territories of Naples, Pompeii, and Nola, Ferdinando De Simone sketches, for the entire Vesuvian region, a highly integrated and specialized agricultural economy, in which cities, for certain agricultural products, were dependent on the territory of neighbouring cities and on the outside world; other products, however, particularly wine, were exported on a substantial scale.

Chapter 2, by Miko Flohr, homes in on the city itself and discusses some of the basic parameters that underlay Pompeii's economy, particularly focusing on the relationships between population, hinterland, and consumption. Starting from a critical analysis of Pompeii's excavated housing stock, the chapter argues that the city's size and the degree to which sub-elite groups had structural access to elements of the elite lifestyle can only be understood from Pompeii's ties with the outside world, whether through trade or through capital flows.

Quality of Life

The subsequent chapter, by Nick Ray, explores the possibilities of applying consumer theory to the Pompeian record. Ray uses a set of statistical tools to analyse assemblages of everyday domestic artefacts found in a selection of Pompeian houses, particularly focusing on metal, glass, and pottery vessels. The analysis highlights not only the fact that a wide range of artefacts was available to many people at Pompeii, but also that different households of

comparable socio-economic status followed differing consumption strategies, suggesting that a modern concept such as ‘consumerism’ may be of considerable use in understanding Pompeii’s consumer economy.

Chapter 4, by Erica Rowan, focuses on food consumption. While the chapter’s primary focus lies with the food remains found in the sewer underneath Cardo V at Herculaneum, the resulting picture is also relevant to an understanding of Pompeii’s food economy. Importantly, Rowan shows how varied and cosmopolitan the diet in both Pompeii and Herculaneum had become, and how that appears to have been a development of the last centuries BC—earlier, the diet appears to have been much more locally oriented.

In Chapter 5, Estelle Lazer discusses the health of Pompeii’s population based on the skeletal remains found on site. While this is a massively complicated dataset due to the way in which the evidence has been recorded and preserved, it is still possible to extract some basic health indicators. These do seem to allow for a more optimistic view of the health of the Pompeian population than some scholars have suggested in the past. In particular, the evidence suggests that a significant number of Pompeians was living well into old age.

Contextualizing Economic Life

The subsequent four chapters touch upon the theme of urban economic life. One key issue in understanding Pompeii’s economy, and particularly investment, is the theme of location: not all locations in the city were commercially attractive in the same way, or to the same degree, and understanding Pompeii’s commercial landscape and the strategic choices made by investors at certain locations requires a detailed knowledge, particularly of the way people moved through the city. Substantially refining earlier work by Laurence and Kaiser, Chapter 6 by Eric Poehler discusses a new model of movement through the city, one that gives a much more detailed insight into the economic potential of certain places—not only the expected major thoroughfares of the Via degli Augustali–Via Stabiana–Via dell’Abbondanza axis, but also streets such as the Via Consolare, the Vicolo di Modesto, and the Via delle Terme, which emerge as busier than had been appreciated.⁴¹

Chapter 7, by Nicolas Monteix, gives a thorough reassessment of the evidence for manufacturing and retail in Pompeii, and analyses the ways in which it can and cannot be used to understand Pompeii’s economic history. Monteix’s cautious approach to the evidence leads him to reject approaches based on quantification; instead, he proposes approaches based on understanding

⁴¹ Laurence (1994); Kaiser (2011).

investment strategies, and on analysing the *système technique*, as defined by Bertrand Gille.⁴²

Chapter 8, by Damian Robinson, examines a specific area of the city, discussing the commercial development of insula VI 1, in the north of the city, and particularly the Casa delle Vestali, which is the largest property in the block. Robinson starts from the data gathered by the Anglo-American Project, and connects these to literary evidence to sketch a picture of the development of commercial investment over time, arguing that Pompeii's upper class, exemplified by the consecutive owners of the Casa delle Vestali, saw economic investment as a key priority—from the second century BC right up to the last years of the city's existence.

Chapter 9, by Domenico Esposito, highlights a form of production of which the results are highly visible in Pompeii but which has rarely been discussed in economic terms: painting. Esposito provides a detailed discussion of the organization of two identifiable painters' workshops, showing how they operated on a relatively large scale and worked on several locations in the city at the same time. Interestingly, the two workshops appear to have served different segments of the market, with one working mostly for the elite, and the other one mostly decorating middle-class houses, shops, and restaurants. The chapter evokes a detailed and vivid picture of a branch of the economy that, especially in Pompeii's last years, must have been flourishing.

Money and Trade

Part IV groups together four chapters which explore questions of coinage, money, and commercial transactions, starting with a methodological contribution from excavations at Pompeii and moving to a broader picture of trade in the Bay of Naples region. In Chapter 10, Steven J. R. Ellis explores the analytical possibilities of the coin evidence gathered in his excavation of the two house blocks surrounding the lowest stretch of the Via Stabiana. Ellis notes that his coins, even though many come from shops, were mostly found in construction layers, not in deposits suggesting coin loss; he introduces the concept of 'afterlife coinage' as a tool for discussing the whereabouts of coins between the moment that they stopped circulating as coins, and the moment of their final deposition in construction layers. At Pompeii, Ellis argues that coin finds often should be seen as indicating building activity rather than as a proxy for retail activities; in the Porta Stabia area they serve to highlight a commercial 'boom' in the Augustan period, whilst at the same time suggesting a massive increase in monetary exchange in the preceding period in Pompeii in general.

⁴² Gille (1979).

The next three chapters relate the evidence of Pompeii to the wider historical context in which the city operated. Chapter 11, by Richard Hobbs, discusses the Republican coins found in the excavation of insula VI 6, highlighting both the circulation of large quantities of coins from cities in the Western Mediterranean, particularly Ebusus and Massalia, alongside local (or regional) imitations of these coins, which sheds new light on the commercial ties of Pompeii and the Bay of Naples region in the second and early first centuries BC.

The subsequent chapter by Koenraad Verboven discusses currency and credit in the entire Bay of Naples area. Focusing on the first century AD, Verboven sketches the structural elements of the monetary economy of the region within which Pompeii functioned. Connecting evidence from within the city and the archive of the Sulpicii, found just outside Pompeii but referring principally to transactions at Puteoli, with literary and juridical texts, he argues that, while coins were a dominant element in the regional money system, credit and accounting instruments played a crucial role in the economy, reducing transaction costs perhaps to an extent rare in many other places in the Roman world.

The archive of the Sulpicii also plays a central role in Chapter 13, by Wim Broekaert, who focuses on the social institutions and juridical frameworks surrounding long-distance trade in the port of Puteoli, and particularly on how traders dealt with fraudulent business partners. Broekaert shows how the close-knit business community at Puteoli used the flexibility inherent in the Roman juridical system, as well as reputation mechanisms, to prevent their business partners from fraudulent behaviour. While this chapter does not directly deal with Pompeii itself, it highlights a central element in the economic world in which Pompeii functioned: the everyday processes of business and trade.

The volume concludes with a response by Wim Jongman, whose 1988 monograph on the economy and society of Pompeii has played a pivotal role in approaches to Pompeii's economy over the past twenty-five years. In Chapter 14, Jongman assesses how research over the intervening period has altered the picture, and suggests further avenues for fresh enquiry, in particular, on understanding the economic realities of agriculture in the Vesuvian region. As he rightly observes, the chapters of this volume together provide a more positive assessment of Pompeii's economic performance than some past accounts—including Jongman's own.

DISCUSSION

Our view of Pompeii's economic history is far from complete yet, and as several of the contributions to this volume have suggested, there are still many roads that can and need to be explored further, particularly when it comes to

our understanding of the city's consumer economy, the economic strategies that shaped the built environment, and the ties of Pompeii with its regional surroundings, and its immediate hinterland and agricultural production. The chronological dimension of our understanding of Pompeii's economy can also be strengthened considerably, as undoubtedly will happen following the final publication of all projects that, in recent years, have explored the historical development of Pompeii's *insulae*. Yet, in this volume, Chapters 4, 8, 10, and 11 already highlight how Pompeii's economy changed between the second century BC and the first century AD. While Pompeii will never provide us with the possibility to discuss the historical development of an urban economy from the beginnings of urbanization to late antiquity, it does provide us with the possibility to study the development of an urban economy from the middle Republican period until the late first century AD, when urbanism in Roman Italy was at its peak, or close to it. Moreover, it increasingly does so in a way that is unparalleled elsewhere: any scepticism about the possibility of studying historical change in the urban economy of Pompeii implies scepticism about the general possibility to do this in *any* urban economy in the Roman world.

Thus it seems worthwhile to delineate the broad characteristics, as they currently appear, of Pompeii's economy on the eve of the city's destruction. We should not lose sight of the fact that Pompeii was a port city on the Bay of Naples, and even though its harbour has not been identified with certainty, we may presume it served at least three functions: the export of some of the agricultural production (especially wine, as discussed by De Simone) of the city's territory, and that of Nuceria and Nola too; the import of a range of consumption goods from overseas; and, probably, a role as a fishing harbour providing at least the city and immediately neighbouring villas with fresh fish and shellfish, and no doubt also serving the fish-salting industry, of which there is evidence.

The city's connectivity, and its particular location on the Bay of Naples, with a high concentration of elite (including senatorial and equestrian) villas in the vicinity, perhaps gave it access to an unusually wealthy market. Estimates of the population (see Chapter 2) at between 7,500 and 13,000 (including the immediate suburbs) put Pompeii squarely in the range of middling cities, well above the hundreds of towns with populations of up to c.5,000, but well behind the larger cities (many of them ports) around the Mediterranean whose populations ranged from 25,000 to in excess of 100,000.⁴³ The city's role as a local and perhaps regional market is emphasized by 800 shops lining the main streets, their location strongly influenced by the intensity of traffic along particular thoroughfares. These fixed installations for the sale of particular goods, in addition to the commercial public spaces of the forum and

⁴³ Cf. Wilson (2011).

macellum, are perhaps a characteristic feature of Roman urbanism in the Western provinces; they show a thriving retail economy, with a high degree of specialized trades, serving both local residents and the inhabitants of the surrounding villas. Especially interesting is a group of fourteen *tabernae* built as a single complex outside the Herculaneum gate, clearly an investment in commercial property. Striking too is the high number—158—of bars and establishments selling hot food, although it is unclear whether Pompeii was unusual in this respect, or that we simply do not have evidence of equivalent quality from elsewhere.⁴⁴ The thirty-nine bakeries suggest that, by the mid- to late first century AD, most of the urban population consumed shop-bought bread, again an indication of specialization of labour; the finds of large numbers of commercial mills at, for example, Timgad, Djemila, and Volubilis, suggests that this was not unusual in the Roman Empire, at least from the second century AD.⁴⁵ This commercial landscape was animated by a high degree of monetization, with the use of small change facilitating quotidian purchases, and credit arrangements available for larger, mercantile, transactions and investments.

The numerous *tabernae* included a number of relatively small-scale workshops, as well as retail shops, but the urban landscape of production was also characterized by a number of larger-scale workshops, some inserted into large atrium houses, and thus implying sufficient wealth to own such a property.⁴⁶ Those which can be identified from their archaeologically durable built infrastructure include dyeworks, *fullonicae*, tanneries, perfume workshops, and pottery workshops. The evidence demonstrates capital investment in specialized plant for a variety of manufacturing processes, and incidentally gives the lie to the notion that smelly and polluting activities were banished outside the city limits.⁴⁷ Moreover, a series of workshops (the so-called *officinae lanificariae*) whose function is disputed—some see them as for washing fleeces—also represent specialized investment in some kind of production; whatever these were for, there are between thirteen and twenty-four of them.⁴⁸ Together with the epigraphic evidence for the production of fish sauce and related products at Pompeii, by A. Umbricius Scaurus and others, it seems that the city's production activities encompassed a range of products, each produced on a scale requiring multiple specialized workshops—and, in the case of textiles, specialized workshops for different stages of production. Some properties in the east of the city also specialized in market gardening and viticulture.

⁴⁴ Chapter 7 (this volume: 218).

⁴⁵ Volubilis: Luquet (1966). Timgad and Djemila: A. Wilson, personal observation in 2013. For the Pompeian bakeries see Chapter 7 (this volume: 218).

⁴⁶ Cf. Flohr (2007).

⁴⁷ See on this, also Flohr (2013: 229–34); Monteix (2013).

⁴⁸ Chapter 7 (this volume: Figure 7.3).

These shops and workshops, and larger production units, often formed part of elite property portfolios (as Chapter 8 emphasizes), which also included rental properties. We cannot always be sure whether shops incorporated into the street façades of elite houses were directly owned, and run through slaves, or through freedman agents, or were rented out; but the key point is that income from them formed an integral part of the income streams of Pompeii's elites. Certainly A. Umbricius Scaurus, with a floor mosaic in his atrium representing the *urcei* in which his fish sauce was traded (complete with *tituli picti*), was not shy about advertising his involvement in trade to visitors.⁴⁹ In Pompeii, profit was not something of which to be ashamed.

To sum up, Pompeians consumed a rather varied diet, lived reasonably long and healthy lives, and had relatively easy access to consumer goods and art. The city's economy was highly monetized from at least the late first century BC onwards, and maintained active ties with the Bay of Naples region and beyond. Continuous investment in commercial facilities like shops and workshops testifies the vibrant and stable character of the Pompeian economy. Indeed, for a pre-industrial city, first-century AD Pompeii was performing rather well, and it increasingly seems that it had been doing so for at least the two preceding centuries as well. We can only conjecture what its developmental trajectory might have been like had its growth not been suddenly arrested in AD 79; how would it have compared, in the mid-second century, with other cities on the Bay of Naples and ports around the Mediterranean?

As far as the Roman economy is concerned, this book does not offer a lot of support for the more pessimistic readings of Roman economic performance. Two general points may be mentioned. In the first place, many chapters highlight the interconnectedness of Pompeii's economy. As Chapter 11 emphasizes, this began long before the grain fleet started to arrive in Puteoli on a yearly basis: from at least the second century BC onwards, Pompeii and its surrounding countryside were connected, directly or indirectly, to the Mediterranean trade system, and these connections, which also facilitated the trade in Vesuvian wine, were of vital importance in shaping the Pompeian economy, and its society. Without these networks, Pompeii would have been a different, and probably a smaller and less wealthy city. Secondly, Pompeii, and—as Chapter 4 clearly suggests—Herculaneum as well, were able not only to support the consumption of luxuries by a small group of elite households, but also by large parts of the rest of the population. Even if the Bay of Naples region is not representative of Roman Italy or the Roman world in general, this means that, under the right circumstances, Roman urban economies were able to provide opportunities for non-poor, non-elite households to accumulate wealth, and—thus—enable them to use the urban economy as a tool for social

⁴⁹ On these mosaics see Curtis (1984).

advancement. Whether we want to call these households ‘middling groups’, ‘middle class’, or something else does not matter: their existence adds a flexibility to Roman socio-economic landscapes that should not be underestimated. The question should thus no longer be whether these non-poor, non-elite households existed, but how common they were and under which circumstances they could flourish: their presence or absence is a useful tool for understanding the success or failure of specific urban economies.

In any case, looking at mid-first-century AD Pompeii—before the earthquakes began—one sees a flourishing urban economy that essentially was neither primitive nor modern, but that profited massively from the unique political and economic circumstances created by its position in the heart of the Roman Empire. Studying this very specific urban economy is not a cul-de-sac, but serves to illuminate also the larger historical processes at work, and what they could bring to local economies. In this respect, it is only to be hoped that future work on the economic history of specific cities will enable the scholarly community to compare the local ‘outcomes’ of these large historical processes in a more informed way.

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Part I

City and Hinterland

The Agricultural Economy of Pompeii

Surplus and Dependence

Girolamo Ferdinando De Simone

This chapter investigates the economic performance of the Pompeian countryside. In particular, it evaluates to what extent the countryside provided the basic staples the city needed—such as grain, oil, and fuel—and to what extent it produced marketable surpluses. To find an answer to these questions, this chapter will first reconstruct the ancient landscape of the environs of Vesuvius, and calculate the scale of local demand by reconstructing the region's urban and rural population. Analysing the evidence for agriculture from both literary sources and archaeological data, it will then attempt to create a model that makes it possible to quantify the scale of production and assess its relation to regional demand.

RECONSTRUCTING THE ANCIENT LANDSCAPE

Mount Vesuvius consists today of an almost symmetrical cone-shaped strato-volcano, rising 1,281 metres above the bay.¹ The cone sits in a 4 km diameter caldera, the Somma caldera,² which is now preserved only on the northern flank, forming a wall-like ridge on the north side of the cone, which becomes shallower on the western and south-eastern sides and disappears on the seaward side. Although belonging to the same volcanic complex, Mount Somma and Mount Vesuvius are perceived as distinct entities by both the local population and tourists. The soil of Mount Vesuvius is extremely permeable and has no superficial circulation of water, while Mount Somma, on the

¹ De Boer and Sanders (2002: 74).

² Guest et al. (2003: 25).

other hand, shows several stream-beds. The present rainfall of around 550 mm per year is not enough for consistent springs or streams, which appear only after particularly heavy rains, but until recently the annual rainfall was much heavier.³

The shape and dimensions of the Somma-Vesuvius complex before the AD 79 eruption are still debated.⁴ Traditional interpretations of some passages in the literary sources have led scholars to think that the Somma-Vesuvius complex appeared before AD 79, either as a one-peak conic volcano or as it appears today.⁵ It may be argued that Strabo's description fits better with a caldera volcano and the other sources can be read accordingly.⁶ Thus, the volcano probably was similar in shape to the current Mount Somma without Mount Vesuvius, but with the crater entirely preserved—like an amphitheatre—and slightly higher on the northern side.⁷ This hypothesis finds a convergence with the most recent volcanological models, which have been developed independently of the written sources and suggest a caldera-type volcano (Figure 1.1).⁸ This reconstruction implies that there was a slightly larger area for woodland than nowadays, especially on the north slope of the volcano, while on the south and east sides there was probably more agricultural land to exploit. Also, it is likely that there were as many streams as nowadays on the northern slope. If there was a cone instead of a caldera the same natural resources would be available on each side of the volcano, but in higher quantities. Based on Cioni's reconstruction maps and sections of Vesuvius, it is possible to calculate the area of available land on the mountain for both scenarios.⁹ The current amount of land is 70.5 km², excluding Vesuvius. Assuming a caldera volcano, the ancient amount of land was 85 km²; assuming a one-peaked cone, it was 89 km². Thus, the ancient volcano had a surface area that was 14.5 km² to 19 km² larger than is the case nowadays.

The reconstruction of the ancient plain is even more complicated, since the effects of several eruptions and of human intervention have heavily modified the landscape. The most recent and accurate attempt has been carried out by Vogel and Märker.¹⁰ Based on the analysis of more than 1,800 cores and on the assumption that eruptions cover the land evenly, like blankets, they created a digital terrain model of the Sarno plain, in which a sizeable portion of the plain appears to be occupied by marshes. This would of course limit the area

³ The average value for the period 1926–50 was around 1,000 mm per year. Di Fusco and Di Caterina (1998: 11).

⁴ List of previous studies in Renna (1992: 38–49). For the author's opinion on the subject see De Simone (2011: 289–93).

⁵ Renna (1992: 128–33). See also Sigurdsson (2007: 47–9).

⁶ Strabo 5.4.8; Plut. *Cass.* 9; Florus 2.8.4–5; Dio Cassius 77.2; 66.21–3.

⁷ The present crater of Mount Somma has disappeared on the south and west sides.

⁸ Cioni, Santacroce, and Sbrana (1999).

⁹ Cioni, Santacroce, and Sbrana (1999).

¹⁰ Vogel and Märker (2010).

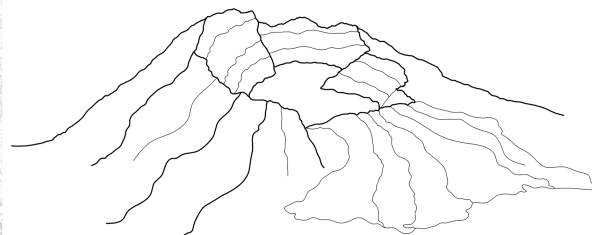
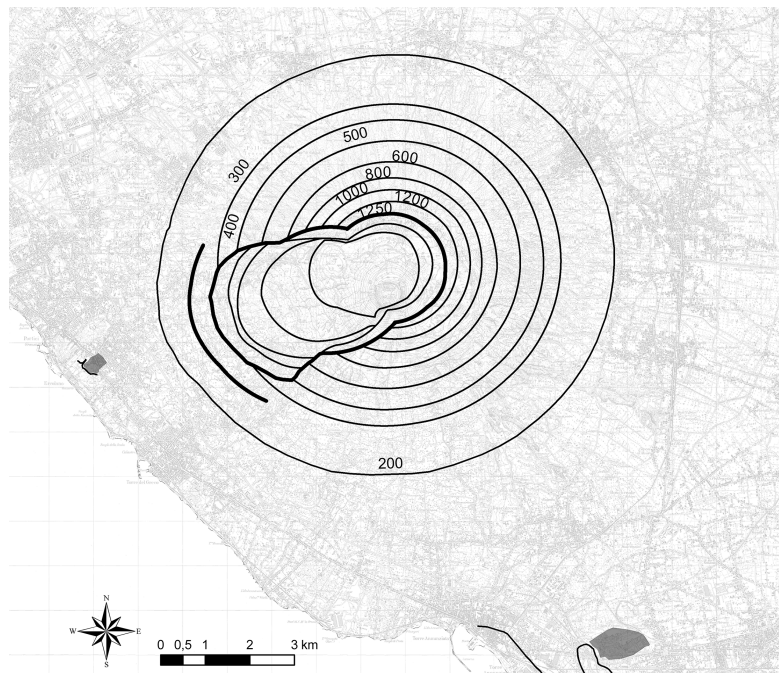


Figure 1.1 Hypothetical reconstructions of the Somma-Vesuvius complex before the AD 79 eruption. Drawing: Girolamo Ferdinando De Simone (after Cione 1999, fig. 12).

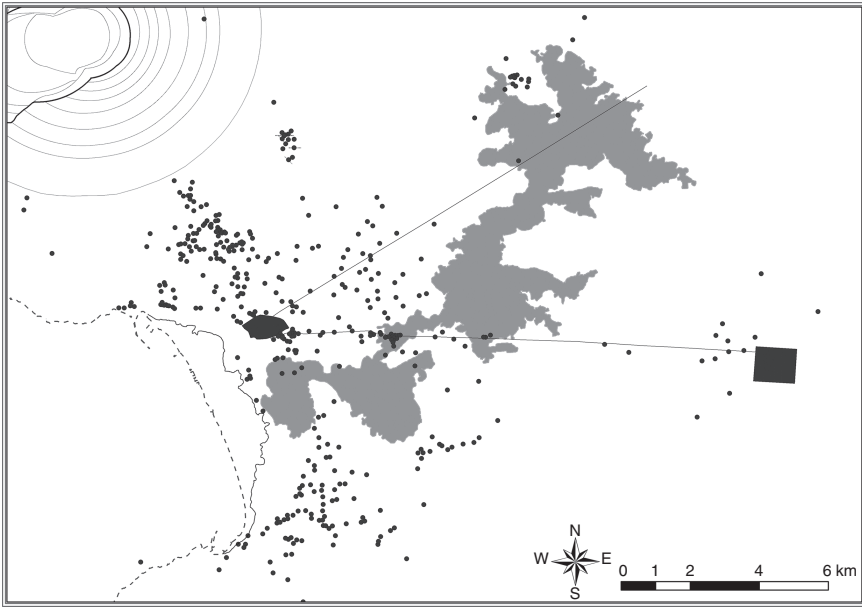


Figure 1.2 Reconstruction of the Pompeian countryside according to Vogel and Märker (2010), with, overlaid, the archaeological map of the sites in that area. Map: Girolamo Ferdinando De Simone.

available for agriculture. However, tested against the archaeological evidence, this model reveals some oddities: some archaeological sites and identifiable traces of the Roman centuriation grid are situated where the model of Vogel and Märker supposes a fluvial or palustrine environment (Figure 1.2). It is thus possible that a smaller portion of the plain was covered by marshes than Vogel and Märker suggest.¹¹

THE CREATION OF THE ARCHAEOLOGICAL MAP

The next question is how this landscape was being used. To this end, an archaeological map of the region around Mount Vesuvius has been compiled. It is essential to put this map in perspective: rather than being an accurate snapshot of settlement patterns over a region, archaeological maps show what is recorded, and are therefore dependent on circumstances of preservation and

¹¹ At the so-called 'Villa of Augustus' in Somma Vesuviana, on the northern slopes of the volcano, a 5 m deep natural channel cut the volcanic deposits of a later eruption (Perrotta et al. 2006: fig. 4C; De Simone, Aoyagi, and De Simone, in press).

on the methodology applied in surveying. The environs of Vesuvius differ considerably from other areas where regional studies have been carried out: in the Vesuvian region natural phenomena and human activities have significantly altered the landscape and destroyed most of the archaeological evidence. The main loss of data stems from two millennia of settlement overlay and sixty years of post-war urban growth. In antiquity, this region was densely inhabited and life continued in the same places throughout the Middle Ages: remains of the Roman period were either included in new buildings or spoliated. At present, the entire province suffers from an exceptionally high population density—with 2,600 people/km² it is the highest in Europe.¹² Population density is particularly high in the belt between Mount Vesuvius and the sea; the situation is less acute on the north slope of Vesuvius, where the average population density is 1,350 p/km². Nevertheless, the expansion of built-up areas prevents systematic field walking for vast areas.

The discovery of new sites occurs frequently, but is often covered up by the Camorra—the Neapolitan mafia. In other cases, the evidence is dug up by commercial archaeologists, but results are rarely published, nor do we know, for all discoveries, their exact location. Undoubtedly, therefore, any barren areas on an archaeological map of the region will not correspond to a lack of settlement, but rather to a lack of data. The archaeological map provided in Figure 1.3 includes 820 sites; it is based on published maps and literature, and on field survey in the territories of Neapolis and Nola. Where there is still a gap of information it must be contextualized rather than used as an argument *ex silentio*: for example, in the Pompeian territory above 100 m, the lack of settlement is easy to understand if one considers the thickness of the volcanic debris and the spread of modern urbanization, with the consequent (and mostly unreported) obliteration of archaeological evidence. Another case in point is the area just north of ancient Pompeii, where research stopped in the 1930s, after the discoveries of the most famous villas, solely because the state forbade it.

Thus, one cannot extrapolate from this map without a model. The model proposed here is based on the assumption that areas with similar features are similarly settled, but it also takes into account the notion that some features, primarily infrastructure and urban settlement, can create a distortion in site distribution: the settlement pattern is generally denser close to cities, roads, and key resources. Following this principle, the region was divided into four types of environments: first, the slopes of the volcano between 100 and 400 m above sea level; secondly, the area uphill from Pompeii between 50 and 100 m

¹² This is more than four times the density of the province of Rome (778 p/km²), which is rather astonishing considering that the size of the entire province of Naples (1,171 km², islands included) is smaller than the city of Rome alone (1,285 km²). Portici has, with 12,311 p/km², the highest population density in the world.

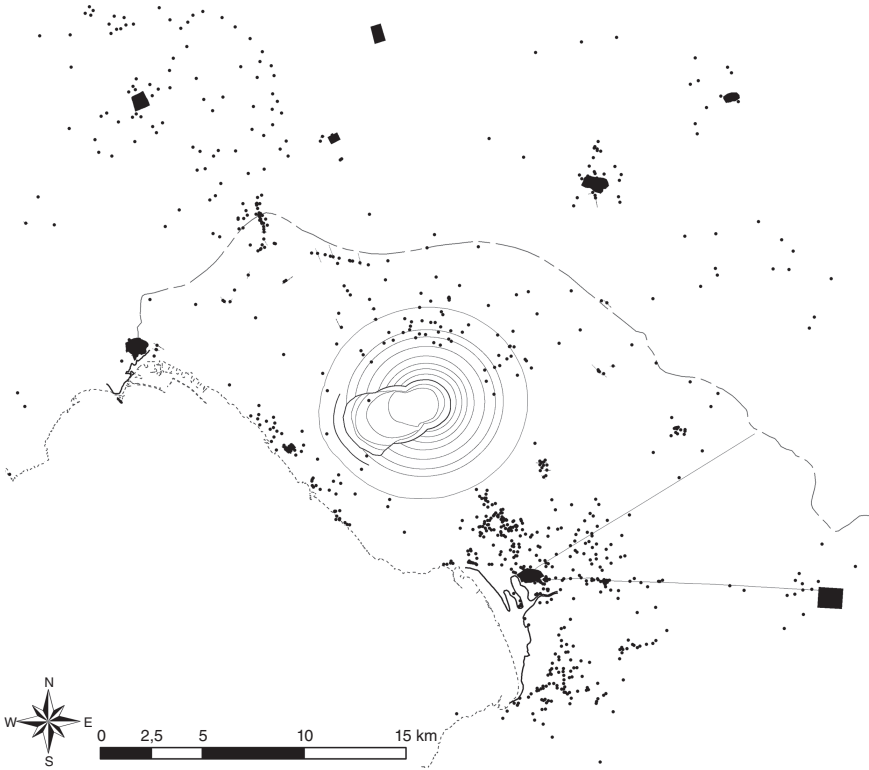


Figure 1.3 Archaeological map of the environs of Vesuvius. Map: Girolamo Ferdinando De Simone.

above sea level; thirdly, the other sectors of Mount Somma between 50 and 100 m above sea level; fourthly, the plain.

A survey on the north slope of the volcano shows a tight pattern of farmhouses (mainly remains of walls associated with *dolia* sherds) on the slopes of the volcano between 100 and 400 m above sea level. Nowadays, this area is carved up by several deep gullies, which are the result of two millennia of volcanic destruction and fluvial erosion. Despite this loss of data, the pattern is still very dense. In the modern town of Somma Vesuviana—where the survey has been particularly intensive—there are remains of farmhouses on the top of each hillock, at a distance of 200 to 300 m from each other. If we combine this with Columella's figure of 100 *iugera* as a hypothetical standard size for each estate and evaluate the density and the percentage of land used, the result is striking. Figure 1.4 has schematically plotted 100 *iugera* as a circle, with the farmhouse at the centre and a radius of 283 m. In most cases, the circle of one villa overlaid the neighbouring villa. This suggests that most of the villas had a property smaller than 100 *iugera*, and indicates that the slopes

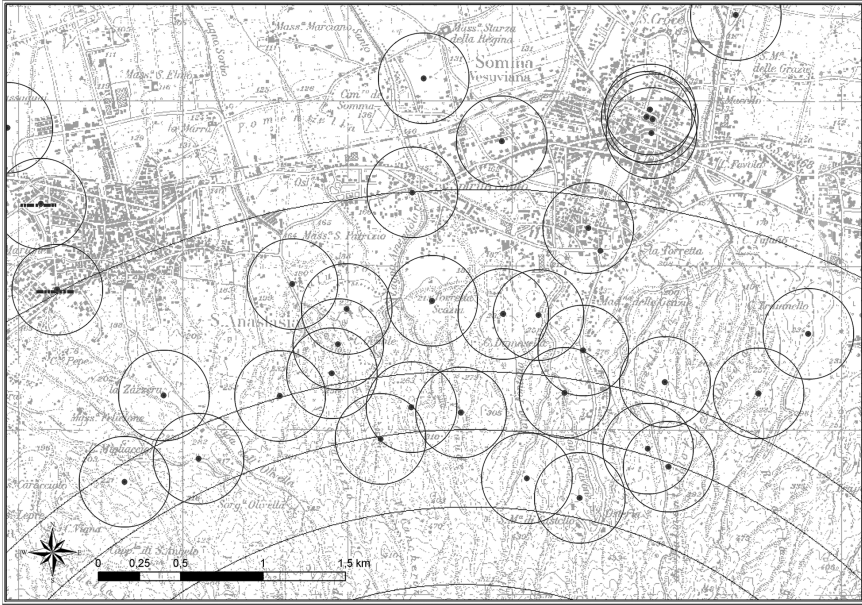


Figure 1.4 Archaeological map of the northern slopes of Mount Vesuvius with 100 *iugera* circles around each site. Map: Girolamo Ferdinando De Simone.

of the volcano between 100 and 400 m were heavily exploited. As the distributional pattern around Somma Vesuviana does not reflect any alignment with infrastructure or the distance from a city, it may be suggested that there was a similar pattern on the southern side of the volcano, especially if one considers the fact that, facing south, the land could have been even more productive.

THE SIZE OF ESTATES

A next step is to establish how large the villas' estates actually were. To calculate the size of a complete estate, one must study the villas in their context. Despite the lack of systematic field survey, some areas of the archaeological map show a very dense pattern, from which it is difficult to imagine that something is missing. This is particularly true in the area of Boscoreale and Terzigno. Three villas can be used to give an indication of the sizes of estates in the region: the Villa della Pisanella and the Villa of N. Popidius Florus at Boscoreale, and Villa 2 in the Cava Ranieri at Terzigno. A polygon has been created around each villa. The polygons roughly follow Thiessen's

Table 1.1 Calculation of estate sizes

Place	Villa	Iugera		Hectares	
		min.	max.	min.	max.
Boscoreale	Villa della Pisanella	33	58.5	8.3	14.8
Boscoreale	Villa di Popidius Florus	22	43	5.6	10.9
Terzigno	Cava Ranieri Villa 2		24		6

principles, but in order to calculate the maximum extent possible, it has been assumed that the neighbouring villas were smaller in size. Moreover, for some of the neighbouring sites we do not have enough information: there are just remains of walls, which could be interpreted either as farmhouses, or residential villas, or even cisterns belonging to the property of the villa in question. In these cases, two polygons have been created, one including, the other excluding the neighbouring site.

As follows from Table 1.1, Vesuvian estates were very small; the largest of the three villas discussed here—Villa della Pisanella—cannot have had a property of more than 60 *iugera*, which is 40 per cent less than Columella's standard for a minimal estate of 100 *iugera*. The small size of Pompeian villas has been used as argument to support the theory of insignificant wine production in ancient southern Campania.¹³ However, the small scale of the individual estates does not necessarily limit the output of the area as a whole. The known evidence suggests a very tight settlement pattern covering the entire surface available between 100 and 400 m above sea level. Considering that the amount of land available in this zone—according to my reconstruction of the volcano before AD 79—is 58.8 km², the total available land is 23,250 *iugera*.¹⁴

POPULATING THE REGION

To understand the dynamics of the agricultural economy of the region around Mount Vesuvius, it is essential to have an idea about how many people lived there—both in the cities and in the countryside.

To calculate the population of the cities, one needs to assess the average population per hectare. This number is calculated through the analysis of the number of average inhabitants per house and the space up taken by public

¹³ Rightly against this perspective is Purcell (1985: 7–8).

¹⁴ One *iugerum* is equal to 2,529 m².

Table 1.2 Estimate of the number of inhabitants for most of the Campanian cities

City	Size	Estimated population	
		150 pp/ha	250 pp/ha
Capua	177 ha	26,550	44,250
Nuceria	113 ha	16,950	28,250
Neapolis	75 ha	11,250	18,750
Nola	73 ha	10,950	18,250
Pompeii	64 ha	9,600	16,000
Atella	53 ha	7,950	13,250
Suessula	45 ha	6,750	11,250
Abella	29 ha	4,350	7,250
Acerrae	20 ha	3,000	5,000
Herculaneum	14 ha	2,100	3,500
Calatia	11 ha	1,650	2,750

buildings.¹⁵ Wilson recently revised the problem of the number of inhabitants per city by reconstructing multipliers for each city.¹⁶ Previously, other scholars have formulated figures as varied as between 100 and 400 people per hectare. For Pompeii, Wilson accepts the figure of 11,000 to 11,500 people, which, across 64–7 hectares, gives a population density of c.166–75 people per hectare, but he tends for Roman cities in general towards a figure which ranges between 150 and 250 people per hectare.¹⁷ These estimates can be used as a starting point for discussing the population of the cities of central and southern ancient Campania (Table 1.2).

Sorting this list by city size, the prominence of Capua stands out clearly; it is twice the size of Neapolis and Nola. Nuceria is second on the list and is double the size of Pompeii. The number of inhabitants for some of these cities will be used in the following section, ‘Land Use’, to understand the ratio between people living in the city and in the countryside.

The rural population is generally calculated by dividing the rural sites hierarchically and assessing an average population for each site rank. Witcher argues that the population density in the suburbium of Rome was about 0.6 people per hectare within 50 km of Rome, and 0.42 between 50 and 100 km.¹⁸ Fentress makes it clear, for her survey in Jerba, that she is using some arbitrary assessments of population per site, which gives an overall population of 0.52 people

¹⁵ For a detailed assessment of the population of Pompeii, see Chapter 2 (pages 53–68).

¹⁶ Wilson (2011). Lo Cascio (1999: 165) states that Beloch’s attempt to calculate the population through the extension of walled areas is not convincing. Beloch used the figure of 70–100 ha for Neapolis, 64.7 for Pompeii. On the other hand, though, for Pompeii, Lo Cascio uses as a minimum 8,000 (Eschebach) and maximum 20,000 (Nissen), which produces an average of 120–300 people per hectare.

¹⁷ Wilson (2011: 172).

¹⁸ Witcher (2011).

Table 1.3 Estimates of citizens and countrymen of Neapolis, Nola, and Pompeii

City	Urban population		Territory size	Rural population		Urbanization rate	
	low	high		0.5 pp/ha	1.5 pp/ha	min.	max.
Neapolis	11,250	18,750	6,270 ha	3,135	9,405	54%	86%
Nola	10,950	18,250	19,470 ha	9,735	29,205	27%	65%
Pompeii	9,600	16,000	12,070 ha	6,035	18,105	35%	73%

per hectare; without the cities, the population density is reduced to 0.3.¹⁹ In the case of the Albegna valley, the population density is of 0.21 people per ha, 0.19 people per ha if only the countryside is counted.²⁰ In 1936, this area had 0.22 people per ha and only 14 per cent of the population lived in the cities. For the Pompeian countryside, Jongman used the data available for the Terra di lavoro (*ager Campanus*) around AD 1600 to infer the population of the Pompeian territory in antiquity.²¹ According to those figures, there was, on average, a population of 1.6 people per hectare.

Starting from these estimates, it is possible to reconstruct population figures for the territories of towns by estimating their size. Table 1.3 shows population estimates for the territories of Neapolis, Nola, and Pompeii. The borders of each territory were defined based on the extensions of the centuriation grids and the distance to smaller towns surrounding them; in order to simplify the division of the land and the calculation of the areas, only the plain and the slopes of Vesuvius were included: the Apennines in the territory of Nola were omitted also, because there is not enough data to hypothesize whether there were settlements in this area and how tight the settlement pattern might have been. The urbanization rate seems extremely high, especially for Neapolis where it was at least 54 per cent.

LAND USE

The next step is to reconstruct what was actually produced. The use of ancient sources for the reconstruction of land exploitation is problematic but inevitable, as they attest to typical productions that covered most of the land. Traditionally, scholars have tended to focus on creating an undifferentiated list of cultivated species. For example, Jashemski and Borgongino offer lists of plants and vegetables attested in literature, art, and every kind of archaeological evidence, thus creating a long list of species which tells us little about Campanian

¹⁹ Fentress (2009: 133).²⁰ Fentress (2009: 143).²¹ Jongman (1988: 72–3).

agriculture.²² The present analysis rather aims at the identification of typical and intensive cultivations.

Many ancient authors point to the fertility of the Campanian plain and to the mythical contest between Bacchus and Ceres for supremacy on the land.²³ Vergil refers to the richness of the alluvial plain, by which he means the Capuan ploughed soils, the coast near the Vesuvian ridge, and the Clanus.²⁴ Mount Vesuvius is also seen as very fertile; in the sources it is a cultural topos for wine production. Ancient sources describe two-thirds of it as covered by vineyards; the upper third was covered by woodland.²⁵ Martial connects the environs of Vesuvius before the AD 79 eruption to Hercules, Venus, and Bacchus, who represent Herculaneum, Pompeii, and Vesuvius respectively.²⁶ The latter link is confirmed by the frequent images of Bacchus in most of the rural sites as well as in some inscriptions, and many passages in ancient sources on southern Campania.²⁷

Our sources mention four varieties of grapes. First, the *Aminea gemina minor* cultivated on the slopes of Vesuvius and on the Surrentine hills, of good quality but of a low yield.²⁸ Second, the *Murgentina*—also called *Pompeiana*—originally from Sicily and transplanted to the Vesuvian area.²⁹ Third, the *Holconia* (from the Pompeian gens *Holconia*) probably cultivated in the *ager Pompeianus*. Finally, the *Vennuncula* (or *Surcula*), which was produced on Mount Vesuvius and the Surrentine peninsula and probably the least valued, but the most common, grape.³⁰ These four kinds of grapes were used to create many kinds of wines, such as the *Vesuvinum*, which was the most common, the *Pompeianum*, and the *Surrentinum*.³¹ Pliny mentions the *Trebellicum* as one of the exciting new names among Campanian wines.³²

Beyond wine, Pliny mentions the quince of Neapolis as highly valued, while Pompeii and Herculaneum were famous for figs.³³ Other products were more typical of the plains. Pompeii was famous for one particular kind

²² Borgongino in Stefani (2005: 71–5) lists all the species of vegetables found.

²³ Plin. *N.H.* 3.60; Strabo 5.4.3.

²⁴ Verg. *Georg.* 2.217–25.

²⁵ Plin. *N.H.* 18.111; Strabo 5.4.8; Flor. 1.11.3–6; Aus. *Mos.* 210; Varro *R.R.* 1.6.3. An indirect reference to vineyards is also in the episode of Spartacus, who escaped Clodius Glabrus' siege of Vesuvius by means of ropes made of vine twigs: Frontin. 1.5.21; Pluth. *Crass.* 9; Flor. 2.8.4–5.

²⁶ Mart. 4.44.1; Gigante (1998).

²⁷ De Simone (2011). Interestingly, the triad is attested also in an inscription in the Villa of Popidius Florus at Boscoreale. Stefani (2005); Renna (1992: 35). For wine production on Mount Vesuvius see Aus. *Mos.* 210; Flor. *Epit.* 1.11(16).5; Cass. Dio *Hist. Rom.* 66.21–3.

²⁸ Colum. 3.2.10; Plin. *N.H.* 14.21.

²⁹ Colum. 3.2.27; Plin. *N.H.* 14.34–5.

³⁰ Plin. *N.H.* 14.34–5; Hor. *Sat.* 2.4.71.

³¹ *Vesuvinum/Vesvinum/Lympha Vesuviana*. CIL 8.22640, 31; CIL 4.5622.

³² Athen. 1.27c; Plin. *N.H.* 14.69. The wine is named after the locale where it grows, four Roman miles (i.e. 6 km) from the city. In the same passage Pliny mentions the *Cauline* wine (produced close to Capua), and the *Trebulan* and the *Trifoline*, which should be in either one or the other territory, while the *Pompeian* wines are clearly listed subsequently.

³³ Quince: Plin. *N.H.* 15.37. Figs: Cato 8.1; Plin. *N.H.* 15.72.70; Macrobi. 3.20.1.

of onion.³⁴ The territories of Neapolis and Capua were particularly important for perfume production: Pliny the Elder states that the fame of Campanian perfume surpassed the once extremely popular Corinthian perfume and that a common saying was that Campanians produced more scent than other people did oil.³⁵ According to Columella, cabbage was widely cultivated throughout Campania, mostly in damp areas, as it requires much water.³⁶

Ancient authors also inform us about arboriculture. Cypress was planted along the rivers as well as in muddy areas. Cato names Minius Percennius of Nola as an expert in the planting and propagation of this tree.³⁷ Percennius recommended planting cypress in very muddy/swampy land (*pulla*). Varro suggests its use as a boundary-maker between estates, as in his property on Vesuvius, but most likely it was mostly used for stakes and props, as Pliny suggests.³⁸ Ancient sources mention three species of woodland trees: the hazelnut, the fir, and the chestnut. Hazelnut and fir were grown in the Apennines. Cato mentions the territory of Abella as one of the only three areas where good hazelnuts were produced.³⁹ Vitruvius mentions fir only in the Apennine ranges and praises the Campanian fir as the best.⁴⁰ Neapolitan chestnut was particularly famous. Pliny states that the only two edible kinds are from Tarentum and Neapolis.⁴¹ He also provides some details about two particularly good and renowned kinds of chestnut, bred in the territory of Neapolis by the Roman knight Corellius and his freedman Tereus, after whom they were named.⁴²

The species listed can be roughly divided into four environments—mountain, hill, plain, and riverside. Chestnut is attested in the territory of Neapolis, therefore it would have been grown either on top of Mount Vesuvius or on the hills of the Phlegraean Fields. In the sources, fir and hazelnut are associated with the Apennines, which suggests they were cultivated in the Nolan mountains and beyond, while vineyards are placed on the hills of Vesuvius and on the hills of the Phlegraean Fields, though they could also have been grown on the plain, as today. Orchards could have been located on both the hills and the plain, where plants for perfumes were grown as well. In the more humid areas of the plain cypresses could be found, as well as areas for horticulture.

It is important to note that this brief overview of literary evidence is more than a random list of cultivations. The species mentioned were distinguished by authors for either quality or quantity: they all seem to have been the object

³⁴ Colum. 12.10.1. ³⁵ Plin. *N.H.* 13.5; 18.111.

³⁶ Colum. 10.127–39: the shores of Cuma, Capua's rich plain, at Stabiae, in Vesuvian fields, at Neapolis by Sebethus' stream, and at Pompeian marshes. Pliny (*N.H.* 19.140) mentions the Pompeian cabbage too.

³⁷ Cato 151. ³⁸ Varro 1.15; Plin. *N.H.* 16.141.

³⁹ Cato 8.2. Significantly, the Roman name for the hazelnut is *corylus* or *nux abellana*, which refers to the vast production in the territories of Abella/Abellinum. Cf. Borgongino (2006: 36).

⁴⁰ Vitruv. 2.10.1.

⁴¹ Plin. *N.H.* 15.94; also Martial (5.78.14–15) emphasize the quality of the Neapolitan ones.

⁴² Plin. *N.H.* 17.122.

of specialized cultivations in some way or another, even in the case of species we would not consider cash crops, such as chestnuts and cypresses. The question is on what scale all this took place. In that respect, it is significant that many knights and senators owned agricultural land in Campania: these people were probably interested in making good profits on the (Roman) market rather than simply satisfying local demand, and their economic power would have enabled them to accumulate rather large estates. This opens up the possibility for a model in which crops were grown on a large scale and constituted a well-organized agricultural landscape, rather than a random scatter of species.⁴³ It is necessary, however, to test this model against the archaeological evidence.

Wine

Literary and archaeological evidence suggests that viticulture dominated the slopes of the volcano. Wine production has been much studied on the south side of the Vesuvius, because of the farmhouses discovered at the beginning of the twentieth century in the Pompeian territory. Scholars used this evidence to hypothesize that the southern slopes of the volcano and the entire Pompeian plain were mostly devoted to wine production.⁴⁴ This theory was strongly opposed by Jongman, who emphasized the lack of farmhouses on some sections of the volcano and especially on the plain.⁴⁵ Instead, he suggested that the main production of the plain was grain.⁴⁶

To calculate the amount of wine produced, past scholars have used a villa-centred approach. Indeed, from the number of *dolia* in a wine cellar one can estimate the amount of wine produced and, ultimately, the size of the vineyard. However, this method ignores other cultivations and relies on the ancient sources to calculate the extent of the entire estate. For example, Day hypothesized that one third of estates was normally used for other cultivations.⁴⁷ This hypothesis was based on Columella, but it was not tested against the archaeological evidence.⁴⁸

To estimate the amount of wine produced, it is first necessary to calculate the amount of *cullei* produced per *iugerum*; on that basis, it becomes possible to calculate the size of the vineyards and the range of production using a sample of wine cellars. Using the archaeological map to calculate the estate size, it becomes then possible to reconstruct the percentage of land covered by vineyards.

⁴³ Jashemski and Meyer (2002). The other scholars working in the Vesuvian area adopt the same methodology: Stefani (2002; 2005); Borgongino (2006).

⁴⁴ E.g. Etienne (1982: 184).

⁴⁵ Jongman (1988: 123).

⁴⁶ *Contra*: Purcell (1990).

⁴⁷ Day (1932: 183–4).

⁴⁸ Columella 4.30.

Table 1.4 Average productivity and estate size according to literary sources and contemporary scholars

	Estate size	Productivity	Wine produced
Columella (<i>RR</i> III, 7–11)	100 <i>iugera</i> (252,000 m ²)	3 <i>cullei/iugerum</i>	
Pliny (<i>NH</i> XIV 4, 52)		7 <i>cullei/iugerum</i>	
Cato (<i>Origines</i> fr. 2 Jordan = Varro, <i>RR</i> I, 2, 7)		10 <i>cullei/iugerum</i>	
Varro (<i>RR</i> I, 2, 7)		15 <i>cullei/iugerum</i>	
Day (1932) = Etienne (1982) (Pisanella)	90/100 <i>iugera</i> (66 vy) (252,000 m ²)	3 <i>cullei/iugerum</i>	938 hectolitres
Jashemski (1973) (Foro Boario, Pompeii)		10 <i>cullei/iugerum</i>	
Jongman (1988)		1 <i>culleus/iugerum</i>	
De Caro (1994) (Villa Regina)	10 (2/7 vy) (25,200 m ²)	2–15 <i>cullei/iugerum</i>	100 hectolitres

There is no agreement among scholars about the productivity of 1 *iugerum* of vineyard. Ancient sources clearly state that it depends on the fertility of the land where the vineyard lies; therefore it fluctuates between 3 and 15 *cullei* per *iugerum* (see Table 1.4). Usually scholars use the low figure of 3 *cullei* per *iugerum* mentioned by Columella; Jongman assumed 1 *culleus* per *iugerum*, but did not present any evidence in support.⁴⁹ Using the archaeological evidence (plant roots) in vineyard II 5 in Pompeii, Jashemski calculated around 10 *cullei* per *iugerum*, which, according to her, corresponds to the present average productivity of the area.⁵⁰

I collected some information from a wine producer whose estates lie on the north slope of the volcano and on the plain.⁵¹ This small enquiry produced the following considerations:

- Vineyards on the plain produce more grapes than those on the slopes. Volcanic soils on the slopes are poorer in potassium, because weathering decreases its absorption, while, on the plain, volcanic soils keep both nutrients and moderately moist ground. On the slopes, the lack of potassium is compensated by the cultivation of broad beans near the vines, but the yield is still 40 per cent less than on the plain.
- On the other hand, vineyards on the slopes produce better-quality wine than those on the plain. The greater temperature range on the slopes favours the generation of tannins, which improve the quality of wine. This contradicts Tchernia's assumption that all Vesuvian wines were of poor quality.⁵² The difference in quality between the two areas probably

⁴⁹ Jongman (1988: 132). ⁵⁰ Jashemski (1968).

⁵¹ Domenico Ceriello, head of the Olivella wine company, undated pers. comm.

⁵² Tchernia (1986: 176–7), based on Plin. *N.H.* 14.70. Similarly, Jongman (1988: 102–4).

explains why ancient authors define Campanian wines both as good and bad, according to the specific variety.

- Productivity is inversely proportional to quality. Very good-quality grapes produce less wine than bad ones. In the environs of Vesuvius, yield—that is, the ratio between litres of wine and quintals of grapes—varies between 60 per cent and 75 per cent, but is usually around 70 per cent.

Figures for modern wine production on the slopes seem to support Columella's ratio of 3 *cullei* of wine per *iugerum* of vineyard. The Olivella wine company's estate on the north slope of Vesuvius lies at 200 m above sea level and is 4,000 m² in area. In 2007—a quite good year—the estate produced 35 quintals of grapes, which were converted with a yield of 65 per cent to 2,275 litres of wine. This corresponds to 2.67 *cullei* per *iugerum*.⁵³ Perhaps, for the Roman period, it makes sense to assume 2 *cullei* per *iugerum* in average years, and 3 *cullei* in good years for the lower slopes of Vesuvius.

The best way to reconstruct the maximum wine production of a villa is to multiply the average capacity of a *dolium* (1.5 *cullei* = c.786 litres) by the number of *dolia* of a wine cellar.⁵⁴ To calculate the size of the vineyard, the number of *cullei* was then divided by three—assuming these cellars were built envisaging a maximum harvest of 3 *cullei* per *iugerum*.⁵⁵ Table 1.5 shows the reconstructed sizes of the vineyards for eight *villae*. As the table suggests, the average Vesuvian vineyard was probably between 14 and 22 *iugera*. Until twenty years ago, the Villa della Pisanella was considered the medium-sized Pompeian villa par excellence.⁵⁶ Its estate was estimated around 100 *iugera*, 66 of which were assumed to have been vineyards. In the early 1990s, the discovery and full excavation of the Villa Regina—the smallest Pompeian villa—led to some rethinking: a thorough survey of the published villa maps demonstrates that Villa della Pisanella and Villa Regina should be, rather, placed at the extremes. The present analysis suggests that Day's calculations of the vineyard of the Villa della Pisanella were wrong: it was only 45 instead of

⁵³ Purcell (1985: 13) uses 2 c./i. as general figure for the antiquity (although this ratio is taken from the yield of the Champagne), but he seems to embrace Jashemski's figure of 10 c./i. for the Pompeian area. In my opinion, the latter figure is incorrect because it is the result of the calculation of how many clusters of grapes a vine can produce, but no wine producer allows the growing and harvest of all clusters, since this practice would produce very weak wine and would impoverish the plant.

⁵⁴ Jashemski (1968) worked with an even bigger average capacity of a *dolium* (1,040 litres), based on the *dolia* found in vineyard II 5 at Pompeii.

⁵⁵ The calculations do not take into account some variables: the actual capacity of each *dolium*, the actual use of each *dolium* (they could also contain oil or be empty), and the use of some *dolia* for ageing the wine. In what follows, it is assumed that the vineyard is used to the maximum, as is the wine cellar.

⁵⁶ Day (1932: 186).

Table 1.5 Quantification of the maximum production of wine and size of the vineyards

Villa	Dolia	Capacity		Size of vineyard	
		cullei	litres	iugera	hectares
Villa della Pisanella	84	126	66,024	42	10.62
Villa of Popidius Florus	80	120	62,880	40	10.11
Villa Regina	18	27	14,148	9	2.27
Tirone 1	28	42	22,008	14	3.54
Matrone Spinelli	20	30	15,720	10	2.53
Cava Ranieri, Villa 2	36	54	28,296	18	4.55
Cava Ranieri, Villa 6	45	67.5	35,370	22.5	5.69
Cava Ranieri, Villa 1	49	73.5	38,514	24.5	6.20

Table 1.6 Calculation of the estate sizes and maximum extent of vineyards (in *iugera*)

Villa	Size of vineyard	Property size	Viticulture (%)
Villa della Pisanella	42	33–58.5	>72%
Villa of Popidius Florus	40	22–43	>93%
Cava Ranieri, Villa 2	18	24	76%

66 *iugera*. The same is true for De Caro's calculations of the vineyard of Villa Regina: it is 9 instead of 6.6 *iugera*.⁵⁷

For three villas, the reconstructed vineyards can be compared to the reconstructions of the estate size discussed in the section 'The Size of Estates'. As follows from Table 1.6, their vineyards would have covered between 76 per cent and 93 per cent of the entire estate. This shows that at least *some* villas used a high proportion of available land for viticulture. If we assume that villas on the lower slopes specialized in viticulture and used about two-thirds of their land for vineyards, they would together have 15,500 *iugera* of vineyard, facilitating a production of 31,000 *cullei* in average years, and up to 46,500 *cullei* in good years. Half of this came from the southern slope. Using Columella's figure of 2,100 HS for 7 *cullei* of poor-quality wine, one could calculate a rough figure of the total monetary value of regional wine production: 9.3 million sesterces in average years, and up to 14 million sesterces in very good years, only for the wine produced between 100 and 400 m above sea level.⁵⁸ This amount should be considered a conservative estimate, because, most likely, the vineyards on the slopes of the volcano produced wine of a reasonably good quality. To get a sense of the difference in price between good and bad wine, we can refer to two inscriptions from the environs of Vesuvius, where prices are provided using the

⁵⁷ De Caro (1994: 128).

⁵⁸ Columella 3.3.10.

sextarius (0.546 litres, 1/960 of a *culleus*) as the unit of measure. The first, from Pompeii, provides three prices—1, 2, and 4 *asses* respectively.⁵⁹ The second, from a fresco in Herculaneum, shows four jars with their prices—1, 3, 4, and 4.5 *asses* respectively.⁶⁰ Converting these numbers to sesterces per *culleus* results in a range from 240 to 1,440 sesterces per *culleus*. As these are retail prices for the local population, Columella's statement seems not too far off the wholesale price for a poor man's wine, and one could estimate that a good one was sold for two to four times that price.⁶¹

There is no evidence of wine production above 400 m above sea level. Between 50 and 100 m, the pattern north of Pompeii is equally dense as on the slopes of Vesuvius, but the situation is unclear for the other sectors of the volcano at the same altitude. Indeed, the proximity of Pompeii probably stimulated viticulture nearby, but since the information available for the other sectors of the volcano is patchier, a similar pattern cannot be inferred without doubt. In at least three cases outside the Pompeian area, ploughing furrows have been discovered near villas, suggesting production was more varied. On the other hand, though, there is clear evidence of wine also being produced at the lowest altitude on the plain, both near Pompeii and Neapolis, in close proximity to the marshes. One could reasonably suggest that a quarter or even a third of the plains around Vesuvius were devoted to wine production. In these cases, one would expect a higher yield of grapes, together with a much lower quality of wine: 3 *cullei* per *iugerum* may easily be an average harvest in this area.

On this basis, it is possible to make some speculative calculations on how much wine was produced on the plains around Mount Vesuvius. Using conservative figures for the amount of land below 100 m above sea level in the territories of Neapolis (4,800 ha), Nola (18,000 ha), and Pompeii (10,600 ha), as well as the conservative ratio of 3 *cullei* per *iugerum* and limiting the total extent of vineyards on the plain to a quarter of the entire area, the amount of wine produced would have been 100,200 *cullei* in an average year. Adding this amount to the average annual wine production of the zone between 100 and 400 m above sea level (31,000 *cullei*), results in the astonishing figure of 131,100 *cullei* for the entire Vesuvian region. This is almost 103 million litres per year, and the rough equivalent of 3.4 million Dressel 2–4 *amphorae*. In good years, the amount of wine produced could easily be up to a third greater.

The question is, of course, how many people could be served by this amount of wine. To discuss this issue, one can use Cato's estimate of 250 litres per person per year, or a lower figure of 100–120 litres, as was common in sixteenth-century Valladolid or eighteenth-century Paris.⁶² Cato's figure is,

⁵⁹ *CIL* 4, 1679. ⁶⁰ Duncan-Jones (1974: 46).

⁶¹ An inscription in Pompeii (Etienne 1973: 231–3) suggests that 2 *asses* was the average price for a cheap wine, not 1 *as*.

⁶² Cato, *Agr.* 57; still common in eighteenth-century Rome. The figures have been taken from Purcell (1985: 13, 15 n.17). Although rather high compared to contemporary Western culture,

in this perspective, the most conservative one; in an average year, production would serve 97,340 people if one takes into account only the wine produced between 100 and 400 m above sea level, or 411,938 people if one includes the wine produced on the plain. An average wine consumption as low as 100 litres per person per year would be enough for more than a million people in average years, and even more in good years. Yet even the more conservative option is striking for the scale of surplus produced: according to the population estimates discussed, the population of the three cities and their countryside might have been around 107,000 people, including slaves and children.⁶³ The Vesuvian region easily produced 4 times the local demand.

Olive Oil

Olive oil production is attested by a relatively small but constant number of mills in almost all the farms, and by a very small number of charcoal remains. Probably olive oil was widely produced but in rather small quantities in each unit—mainly for consumption in the villa and perhaps partially to supply urban needs within the region. Stefani reports a relatively small number of farms in which the main production was oil: three in the *ager Stabianus* and four in the *ager Pompeianus*.⁶⁴ Not all these villas can be checked, mostly because maps are lacking. In the best-documented case at the so-called Casa dei Miri, it rather seems as if wine presses had been transformed into oil presses.⁶⁵ There is no evidence for specialized oil farms in the region before the AD 79 eruption.

Grain

There is a general lack of evidence for grain production. Partially, this can be explained. The lack of records in the pollen analysis is probably due to the fact

Cato's figure fits with the information I gathered from amateur historians and old farmers in the environs of Vesuvius. According to them, just three generations ago farmers used to drink one mug of wine per day—the mug being as big as the German ones used for beer (1 litre). The explanation which has been given to me for such a high consumption of wine was that wine was appreciated mostly for its calorific value, thus this practice was particularly in use among farmers after a long day's work in the field.

⁶³ According to Cato (*Agr.* 57) slaves had to drink *lora* (i.e. marc soaked in water), then a mixture (*vina operaria*) in which the quantity of wine varies between 0.25 and 0.5 litres.

⁶⁴ Stefani (2002: 26). Following Brun (1993), I think that the most noticeable clues to distinguish an olive press from a wine press is the presence of decanting vats and *trapeta* near the presses. *Cellae oleariae* (Cato 13.2; Varro *R.R.* 1.13.7; Vitruv. 6.8) have not been found yet in southern Campania and there was no need for *dolia defossa* for the oil, which, unlike the must, does not need fermentation. Cf. Brun (1986: 135–6).

⁶⁵ Ruggiero (1881: 333–9).

that both the AD 79 and the AD 472 eruption happened during the winter, so that there is no trace of grain in the contexts of the very last phase of the buildings.⁶⁶ Yet the idea that there was grain production on the plain is to some extent supported by the discovery of ploughing traces dated to the first century AD in several areas.⁶⁷ However, the precise meaning of this evidence is actually rather difficult to assess; the dataset pertaining to pre-AD 79 cultivated soils is rather scant and consists of just eight instances, of which four are in the territory of Neapolis, two in the territory of Nola, and two in the territory of Pompeii.⁶⁸ In all instances but one, some ploughing furrows have been excavated, but it is impossible to assess whether they should be associated with cereals or with vegetables. Yet, given the amount of land used for viticulture, and the amount of land needed for other crops, infrastructure, and farms, it is very hard to envisage more than 50 per cent of the available area devoted to growing cereals. However, though clues are missing about what proportion of the land was used for grain production, one can nevertheless calculate the carrying capacity of the arable plain. In fact, the traces of the centuriation grids for Neapolis, Nola, and Pompeii provide reliable figures on their dimensions (respectively 4,800, 18,000, and 10,600 ha); by hypothesizing an *average* annual production of as much as 1,000 kg/ha and a consumption of as low as 160 kg per person several scenarios can be reconstructed (cf. Table 1.7).⁶⁹

Table 1.7 Estimate of the annual production of grain and the people potentially fed with it, assuming an average yield of 1000 kg/ha and an average consumption of 160 kg/person

City	Area available	Proportion of population fed			
		25% of land used		50% of land used	
		low estimate	high estimate	low estimate	high estimate
Pompeii	10,600 ha	106%	49%	211%	97%
Nola	18,000 ha	136%	59%	271%	118%
Naples	4,800 ha	52%	27%	104%	53%

⁶⁶ There exists only one exception, a recently discovered (and unfortunately unpublished) grain basket at the Villa dei Papiri in Herculaneum. In that case, though, the small quantity of grain discovered, the proximity to the sea, the lack of ‘industrial quarters’ in the villa, and the small area available for cultivation nearby suggest that the grain was imported (from Egypt via Puteoli?), rather than locally produced.

⁶⁷ Livy (23.44.7), reporting the siege by Hannibal, tells us that all fields around the city of Nola were cultivated: ‘*mille fere passuum [c.1.5 km] inter urbem erant castraque; eo spatio (et sunt omnia campi circa Nolam) concurrerunt.*’

⁶⁸ One further site is known only from references; it is Roman but it is unclear whether it is dated to the first century AD or later.

⁶⁹ Cf. Chapter 2 (this volume).

It is worth noting that, even with these assumptions, the region would have been able to support itself only if we assume a low population density and a high proportion of land used for cereal growing. Naples in particular would have been dependent on imports, and, in the highest population scenario, only Nola would have been able to produce surpluses. For Neapolis and Pompeii, the picture might be even more dramatic if one assumes a higher annual consumption of grain of around 200 to 220 kg per capita.⁷⁰ Lo Cascio and Malanima even hypothesized an average annual consumption of grain of between 200 and 240 kg per person, concluding that each person needed 1 hectare to survive.⁷¹ In this case, even if the entire plain were devoted to grain cultivation, the territory of Naples would have fed between a quarter and a half of its urban population. Pompeii would have barely managed to feed the entire urban population. Nola, however, would have managed to feed its citizens and would have had enough for 7,000 more, but only if no other crops were grown in its territory.

Other Crops

Grain, oil, and wine were not the only competitors for the exploitation of the plain, since other cereals, legumes, vegetables, orchards, and woodland might have covered part of it as well. It is, however, difficult to reconstruct the precise details. The admirable work by Marina Ciaraldi—on the contents of one *dolium* in Villa Vesuvio in Scafati,⁷² the fodder assemblage from the Casa dei Casti Amanti in Pompeii,⁷³ and the plant assemblages from two other Pompeian houses⁷⁴—informs more on the specific contexts than on the local cultivations. A larger, but more difficult dataset consists of the reported vegetal remains uncovered in the Vesuvian cities in the last three centuries.⁷⁵ This evidence is not the result of a systematic collection and, in most cases, essential

⁷⁰ Whittaker (1988); Purcell (1990). ⁷¹ Lo Cascio and Malanima (2005: 20–2).

⁷² Ciaraldi (2007: 69–74). The content of the *dolium* is interpreted as related to the preparation of a medicine; it contained a 30 cm thick layer of peach stones (70%) and walnuts (30%), while the waterlogged plant remains included a huge variety of plants, all in very small quantity (<10), apart from six species: myrtle (*Myrtus communis* L., 667 fragments), grape (*Vitis vinifera* L., 280 fr.), silver fir (*Abies alba* Mill., 250 fr.), strawberry (*Arbutus* cf. *unedo*, 203 fr.), fig (*Ficus carica* L., 127 fr.), and beech (*Fagus sylvatica* L., >100 fr.).

⁷³ Ciaraldi (2007: 77–8). Contents above 100 fr.: common cleaver (*Galium aparine* L., 580 fr.), perennial rye grass (*Lolium perenne* L., 248 fr.), horsebean (*Vicia faba* var. *minuta* Alef, 215 fr.), smooth meadowgrass (*Poa pratensis* L., 214 fr.), and black bindweed (*Fallopia convolvulus* L., 126 fr.). These species and the others identified in this context imply cultivation of grains, as well as the presence of uncultivated land; horsebean is a rich nutrient for animals and humans as well as a vital nitrogen fixer for other cultivations, grapes in particular.

⁷⁴ The number of fragments for the first century AD is too scant to draw any reliable conclusion.

⁷⁵ I have elaborated the data provided in Borgongino (2006) and reckoned the instances, not the individuals.

metadata are lacking. Nevertheless, the list provided in Table 1.8 provides interesting insights on the situation in AD 79.

All main cereals are present and, if the number of instances is somehow meaningful in this context, it is not surprising to find wheat and barley equally common and the proso millet widely spread, while the foxtail millet (which takes longer to grow) is less present.⁷⁶ Olives and grapes are equally present, nuts are very commonly consumed, but fruits—with the exception of figs—are strangely rather rare.⁷⁷ The presence of some vegetable species, such as the stone pine, the cypress, and the Spanish broom, confirms their endemic presence around Vesuvius. Others, such as pomegranate and walnut, which are generally harvested in October, further confirm the hypothesis of an autumnal date of the eruption. The most interesting piece of information comes from the broad bean. This was a common food among the Romans, but its ubiquity in Pompeii seems to reflect its specialized cultivation well beyond its seasonal availability for the local market.⁷⁸ The frequent occurrence of this legume and of lentils is probably due to their important functions as nitrogen fixers for the soil: even today their cultivation is vital to enrich the volcanic soil in the vineyards and they might have been similarly used in antiquity.

Woodland

Finally, it makes sense to look at regional arboriculture. The evidence here is quite patchy, but still informative. One set of data comes from excavations in the ancient harbour of Neapolis, where pollens have been sampled from eleven stratigraphic units.⁷⁹ The dataset provides only a partial picture of the landscape, but it is interesting to note that almost half of all pollen, in all contexts examined, is from oaks, while the rest—not present in each context—also pertains to deciduous trees; in particular, frequently returning species are the holm oak, the hornbeam, the hazelnut tree, the walnut tree, and the stone pine, which each tend to make up around 10 per cent of the dataset. Less common are the olive tree, the chestnut, the beech, and the silver fir.⁸⁰

More relevant is the work by Veal on the fuel remains from four sites in Pompeii.⁸¹ Her results show a predominance of beech (*Fagus sylvatica*), which, on average, makes up 61.1 per cent of her samples. All other species

⁷⁶ Pliny the Elder (18.100) mentions the very high quality of proso millet from Campania.

⁷⁷ Dates are generally considered imported goods, but they might as well be produced in Italy (Varro 1.67).

⁷⁸ The broad bean is harvested in June.

⁷⁹ Allevato et al. (2010). In general, pollens spread up to 10 km, although those of some species spread much more locally.

⁸⁰ When present, these species account for between 2 and 5 per cent of the pollen.

⁸¹ Veal (2012).

Table 1.8 List of all vegetal remains found in the Vesuvian cities (data gathered from Borgongino, 2006)

Species (Eng.)	Species (Lat.)	Pompeii	Herculaneum	Oplontis	Stabiae	Unknown	Total instances
Broad bean	<i>Vicia faba</i> L.	47	22			17	86
Fig	<i>Ficus carica</i> L.	16	4			13	33
Wheat	<i>Triticum</i> spp.	15	12			4	31
Walnut	<i>Juglans regia</i> L.	7	9	3		3	22
Barley	<i>Hordeum vulgare</i> L.	5	11			5	21
Lentil	<i>Lens culinaris</i> Medikus	5	7			8	20
Onion	<i>Allium cepa</i> L.	6	7			6	19
Stone pine	<i>Pinus pinea</i> L.	8	10			1	19
Olive	<i>Olea europaea</i> L.	11	3			3	17
Grape	<i>Vitis vinifera</i> L.	14	2	1			17
Proso millet	<i>Panicum miliaceum</i> L.	6	2			4	12
Date	<i>Phoenix dactylifera</i> L.	4	5			2	11
Hazelnut	<i>Corylus avellana</i> L.	7		2		2	11
Almond	<i>Amygdalus communis</i> L.	2	2			5	9
Hemp	<i>Cannabis sativa</i> L.	5	1			1	7
Cypress	<i>Cupressus sempervirens</i> L.	7					7
Plum	<i>Prunus domestica</i> subsp. <i>domestica</i> L.	3	2			2	7
Garlic	<i>Allium sativum</i> L.	1	4			2	7
Chestnut	<i>Castanea sativa</i> Mill.	3	1	1		1	6
Hay		5		1			6
Pomegranate	<i>Punica granatum</i> L.		5	1			6
Peach	<i>Prunus persica</i> L.	6					6
Bran		5					5
Oak	<i>Quercus</i> L.	1	1			3	5
Pear	<i>Pyrus communis</i> L.	1	4				5
Durum	<i>Triticum turgidum</i> subsp. <i>durum</i> L.	1	2			1	4
Common wheat	<i>Triticum aestivum</i>	1				3	4
Flax	<i>Linum</i> sp.	3		1			4
Foxtail millet	<i>Setaria italica</i> L.	4					4

Opium poppy	<i>Papaver somniferum</i> L.		1	3		4
Pea	<i>Pisum sativum</i> L.	2	1		1	4
Laurel	<i>Laurus nobilis</i> L.	3				3
Carob	<i>Ceratonia siliqua</i> L.		3			3
Emmer	<i>Triticum turgidum</i> subsp. <i>dicoccon</i> Schrank		3			3
Fenugreek	<i>Trigonella foenum-graecum</i> L.		1		2	3
Black mustard	<i>Brassica nigra</i> L.	1	1		1	3
Oat	<i>Avena sativa</i> L.	1		1		2
Cotton	<i>Gossypium</i> sp.	2				2
Spanish broom	<i>Spartium junceum</i> L.	2				2
Apple	<i>Malus pumila</i> L.			1		2
Oleander	<i>Nerium oleander</i> L.			1	1	2
Radish	<i>Raphanus raphanistrum</i> L.	1		1		2
Service	<i>Sorbus domestica</i> L.	1	1			2
Chickpea	<i>Cicer arietinum</i> L.		1			1
Coriander	<i>Coriandrum sativum</i> L.		1			1
Cowpea	<i>Vigna unguiculata</i> L.	1				1
Lettuce	<i>Lactuca sativa</i> L.	1				1
Holm oak	<i>Quercus ilex</i> L.	1				1
Myrtle	<i>Myrtus communis</i> L.	1				1
Oriental plane	<i>Platanus orientalis</i> L.				1	1

are quite rare—hornbeam is at 11.2 per cent, evergreen oak at 5.9 per cent, but all the others are under 3 per cent. This implies an economic model of specialized cultivation or exploitation. Furthermore, Veal also discussed the carrying capacity of Mount Vesuvius for this specialized cultivation—beech grows best at altitudes higher than 1,000 m above sea level. For the sake of simplicity, I have reworked the figures she produced, correcting the estimates for the people living in Pompeii and its countryside (14,900–35,800) on the land available on Vesuvius above 1,000 m (c.100 ha), and adopting the scenario in which the smallest portion of woodland is used.⁸² Assuming that the average annual need for fuel in pre-industrial cultures is 2 tons per person, that 1 hectare of woodland produces 5 tons of fuel, and that in Pompeii half of the fuel consists of beech, between 3,000 ha and 7,000 ha of beech woodland would have been necessary to satisfy the needs of Pompeii and its countryside—while just 100 ha was available. If this is correct, it must imply that Pompeii acquired a considerable portion of the fuel from other territories.

In the other Vesuvian cities the evidence is much patchier. In Herculaneum, the extant evidence from the furniture and the construction beams shows the prevalent use of silver fir (*Abies alba*) and cypress (*Cupressus sempervirens*) over the other tree species.⁸³ Similarly, in Oplontis, among fifty-one beams, twenty have been identified as silver fir, nineteen as cypress.⁸⁴ While cypress was widely cultivated on the plain, the use of silver fir poses problems similar to those mentioned for the beech—it grows best at altitudes higher than 900 m above sea level; furthermore, the evidence from these settlements shows the preference for specific tree species for timber similar to that noticed in Pompeii for fuel. The difference between the use of silver fir and beech is probably tied to their use rather than the places where they have been found. Indeed, recent analyses of the charcoal remains from AD 79 contexts by the Via Consolare Project in Pompeii show a predominant use of silver fir as timber and of beech as fuel.⁸⁵

Overall, the data presented so far create a fairly clear picture of arboriculture in the environs of Vesuvius. The countryside was interspersed with trees typical of the mild temperature, with oaks, hornbeams, walnut trees, and, among the fruit trees, fig trees the most commonly spread. Hazelnut trees were

⁸² I.e. the one in which the fuel is composed 100% by wood. In reality, in rather efficient economies like first-century AD Italy the percentage of charcoal over uncharred wood might have been at least 50%, but this would mean that even more land would have been necessary.

⁸³ For the furniture, over fifty items: thirty-nine are of silver fir, five of other species, six are non-identified; Mols (2002: 230). The work by Moser, Nelle, and Di Pasquale (2011) on the wooden beams from Herculaneum does not provide any quantitative data, but, according to the authors, most are of silver fir and cypress, with a small percentage made of chestnut (*Castanea sativa*) and walnut (*Juglans regia*).

⁸⁴ Moser et al. (2013). Please note that cypress is used only for the small vertical beams.

⁸⁵ Vairo (2012).

widely cultivated on the slopes of the Apennines, around Abella, though the pollen record also lets us infer a certain distribution near Nola. In the first century AD at least, chestnut trees do not seem to have been too widely cultivated, though the literary sources show that it was cultivated in a specialized way in the territory of Neapolis. On the other hand, the cypress is well attested in the archaeological record. At the beginning of the twentieth century, about one hundred Roman cypresses were found along the river Sarno.⁸⁶ The trees were arranged in quincunx formation at a distance of roughly 3 metres or 10 Roman feet apart. Their formation gives support to the hypothesis that they were intensively cultivated. In 1990, more cypress trunks were found in a nearby location.⁸⁷ Cypress wood is very resistant and was suggested by Vitruvius for use as timber, along with oak, elm, poplar, and fir. Ancient authors also suggest its use for vine props, and probably this would justify its intensive production in this region.⁸⁸ Combining the archaeological record with the Latin passages, it makes sense to hypothesize that it was cultivated along the rivers—the Sarno, and the ancient Clanius and Sebethus rivers—and in the marshy areas near them.

Silver fir and beech were probably cultivated on the higher slopes of Vesuvius as well, but it seems unlikely that that surface was sufficient to cover the needs of the towns and settlements around the volcano. Furthermore, fir was particularly suitable for ship construction, and the constant need for it for the Roman navy in Puteoli might have encouraged the regional production in huge quantities.⁸⁹ Suppliers would not have needed to travel long distances: the Lattari mountains of the Surrentine peninsula are high enough; more suitable land was available east of Nola, in Hirpinia; economically, the most interesting point is not the distance covered or the price paid, but rather the very specialized supply model that this constant provision required, and the scale of the economic network, which goes beyond the idea of a countryside bound to its city as in an autonomous economic cell; it stretches beyond the boundaries of the region, in an economic model of interdependency between the settlements on the plain and those in the mountains.

DISCUSSION

In the context of the debate on the agricultural economy of Campania, the figures discussed in this chapter show that at least some of the cities in the

⁸⁶ Jashemski and Meyer (2002: 105). The trees were about 40 years old when the AD 79 eruption covered them.

⁸⁷ Jashemski and Meyer (2002: 104).

⁸⁸ Colum. 4.26.1; Plin. *N.H.* 17.174.

⁸⁹ Allevato et al. (2010).

region were reliant on outside sources for the provision of some basic staples, like grain and fuel. One important point that arises from this is whether there was an economic convenience in preferring wine over grain. The price of wine discussed—300 sesterces per *culleus*—suggests a yield of 900 sesterces per *iugerum* in average years, which means 3,600 sesterces per hectare. On the other hand, it seems that, in Pompeii, 1 *modius* of wheat cost between 3 and 7.5 sesterces.⁹⁰ Considering that 1 *modius* corresponds to 8.62 litres, which contains 6.8 kg of wheat, the price per kilogram is between 0.44 and 1.1 sesterces; assuming an average yield of 1,000 kg of wheat per hectare, 1 hectare used for wheat would have yielded between 440 and 1,100 sesterces, while by planting it with vines the crop would have been worth—in the worst-case scenario—3,600 HS. Thus, ancient Campania shows that the easy availability of grain—either as overseas imports or as inexpensive trades from the neighbouring regions—fostered the specialization of areas within the region and a considerable interdependency between areas. The emergence of a ‘wine district’—the tight clustering of small productive units—might have been the key factor in the economic success of the environs of Vesuvius, at least until the middle of the first century AD; around this time, the further development of this model in Gaul and Spain, leading to the emergence of less-fragmented estates and bulkier production, allowed wine producers there to be economically more efficient, and thus to be more competitive.⁹¹

The tale of one city is not just an instance of local historiography, but can illuminate regional peculiarities and discrete features of the Roman economy. The identification of multiple trade patterns operating alongside each other observed in the present analysis of the agricultural economy of the Vesuvian region highlights the need for approaches that move beyond the territorial limits of cities and regions, focus on micro-regional and inter-regional trade patterns, and emphasize the role of economic agents like wine producers, shepherds, and merchants, as well as the reliance of some areas on others.⁹² In this respect, the concept of ‘degree of dependence’ can be a useful tool to define the character of a city or a region through its relationships with other areas. This notion would make it possible to discuss the level of openness of a city or a region and the intensity of commerce—human interaction—beyond its monetary relevance.⁹³ This would be useful especially for those goods, like wood, that may have been cheap, but in which the trade was not petty. In this respect, ancient Campania shows a high degree of compartmentalization, and a high level of dependence of each micro-region on other areas.⁹⁴ From this, one can deduce a high degree of specialization of economic agents, though not necessarily also a high productivity for each economic unit.

⁹⁰ Rathbone (2009: 304).

⁹¹ Wilson (2009); Marzano (2013).

⁹² Cf. Fulford (2009: 255–6). For late antique Vesuvius see Martucci et al. (2014).

⁹³ Bowman and Wilson (2009b: 12–13).

⁹⁴ Bowman and Wilson (2009b: 15).

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Quantifying Pompeii

Population, Inequality, and the Urban Economy

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It is very hard to understand the dynamics of an urban economy without having any idea of the size and wealth of the population of the city in question, and its relation with the city's direct rural environment. The relation between population and economy is reciprocal. On the one hand, the size and wealth of an urban population can be a function of the role that a city plays in regional and supra-regional economic networks: an economically isolated city is bound to live off its economic hinterland, while a city that is, in one way or another, better integrated into such networks may have access to additional sources of income, which may boost both its population and its wealth beyond the limits of the surrounding countryside. On the other hand, both the quantity of people living in a city and their buying power play a crucial role in the possibilities for economic investment, and in the array of strategies open to craftsmen and retailers aiming at the local market. In this respect, it is essential not only to understand the cumulative buying power of the urban community, but also how wealth was distributed: an urban economy in which most wealth was concentrated in relatively few hands may work differently from one where buying power was spread over larger parts of the population. The question, thus, is how Pompeii is to be understood in this respect, and what the implications are for our understanding of Pompeii's economy.

There has been much debate about the size of the population of Pompeii since the late nineteenth century. The first to make a reasoned attempt was Giuseppe Fiorelli, in the appendix to his publication on the excavations of Pompeii between 1861 and 1872. Extrapolating from the 22 hectares that had been excavated up to that point, he reconstructed a total population of slightly below 12,000 in AD 79, a figure based on the assumption that the unexcavated

areas were equally densely populated as the excavated part.¹ In response, Heinrich Nissen, believing Fiorelli had been much too pessimistic about the number and size of households in Pompeii, postulated a population of about 20,000 people, a figure subsequently considered exaggerated by Julius Beloch, who proposed a population of 15,000.² These scholars, of course, all worked with a dataset that is incomparable to what is available now: since 1873, the excavated area of Pompeii has approximately doubled in size, and quite a few of the city blocks discovered in the twentieth century appear to have been much less densely occupied than those known in the days of Fiorelli, Nissen, and Beloch. Thus, writing when the excavations had more or less reached their present extent, Hans Eschebach produced a much more pessimistic figure of, at most, 8,000 people.³ Subsequent scholars, most prominently Jongman, have tended to assume a number of inhabitants somewhere between 8,000 and 12,000 people.⁴ Glenn Storey, in his assessment of the population of Rome, reconstructs a virtual number of 11,132 inhabitants, but as he did not publish the data underlying his figures, his calculation cannot be checked.⁵ Unfortunately, none of the estimates has been based on a thorough analysis of the archaeological record as it is now. While Wallace-Hadrill has rightly emphasized the many problems in using the remains of houses for reconstructing numbers of inhabitants in absolute terms, it should be emphasized that considerably more can be done with the evidence than has been achieved so far.⁶ The present chapter hopes to present a step forward in both our understanding of Pompeii's population, and in connecting this understanding to the material remains of the city. While it is obvious that any estimate of Pompeii's population will always remain speculative to some extent—partially due to the natural historical fluctuations of any urban population over time—this is no reason to stop discussing the issue: even if it is impossible to reconstruct the *exact* amount of people living in Pompeii in AD 79, this does not prevent (or make any less desirable) a discussion of the upper and lower limits possible, and what the implications of those limits are.

The historiography of inequality in Pompeii has a much shorter history, and has also been much less hotly debated. Jongman devoted a long chapter of his monograph to the dimensions of social inequality in Pompeii but his account is problematic, as he neglected the archaeological record, and essentially assumed a more-or-less equal socio-economic status for all atrium houses

¹ Fiorelli (1873: 12–13) counted 11,822 inhabitants.

² Nissen (1877: 377–9); Beloch (1898: 273–4).

³ Eschebach (1970: 60–1) argued that only 40 of the 63.5 hectares within the walls were built up, and assumed a maximum of 200 inhabitants per ha.

⁴ Jongman (1988, 110–12).

⁵ Storey (1997: 973). It is unclear how Storey reconstructs, for each region, the dwelling units and the population figures.

⁶ Wallace-Hadrill (1994: esp. 92–103).

in Pompeii.⁷ This led him to a dichotomous model in which rich households lived in *domus*, and poor ones lived in shops and rental apartments in properties owned by the rich. In Jongman's model, the sharpest inequality in Pompeii also was to be found *within* the rich households, between the family of the owner and their slaves. Wallace-Hadrill used a sample from both Pompeii and Herculaneum to discuss differences in house size, but after a brief analysis of the spread of house sizes, he focuses on four quartiles, which is a rather crude way of analysing social differentiation as it makes unnecessary assumptions about, for example, the size and relative wealth of the urban elite.⁸ Damian Robinson applied Wallace-Hadrill's method to Pompeii in its entirety, but based his analysis on four pre-defined property types, which equally involves making unnecessary assumptions.⁹ Moreover, none of these authors was interested in the economic consequences of inequality in terms of the social division of buying power *between* (rather than *within*) households. Arguably, however, it was not the buying power of the landowning elite that determined Pompeii's landscape of retail and consumption, but rather that of the groups between the elite and the poor. If these groups had little money left to spend on other things than everyday food, there was no profit to be made, locally, for craftsmen and retailers specializing in non-food consumer goods such as textiles, tableware, and furniture: the elite was small, and could easily get such items elsewhere anyway. Conversely, if the so-called 'middling groups' (the non-poor, non-elite households) appear to have been able to spend substantially on consumer goods and minor luxuries, then the questions arise of where that buying power came from, and what that tells us about the basis of Pompeii's economy.

This chapter explores the possibilities of a quantitative analysis of Pompeii's standing remains for understanding the size of Pompeii's population in the last years of its existence and for making sense of socio-economic inequality between Pompeii's households. After an introduction to the evidence and its methodological challenges, the section 'Pompeii and its Population' will discuss ways to estimate Pompeii's population, proposing a range rather than a fixed number of inhabitants. The next section, 'City and Countryside', will discuss how this range relates to the carrying capacity of Pompeii's hinterland. The final section, 'Differentiation and Inequality', will discuss how inequality may be measured in the Pompeian archaeological record, and how this should change our view on Pompeii's urban economy. It will be argued that Pompeii's natural hinterland would only be able to feed Pompeii if the number of inhabitants was in the lower part of the range suggested by the archaeological record, and if a large part of the population lived on or close to subsistence levels. Yet as the analysis of inequality and consumption suggests that there were middling groups with considerable buying power, the conclusion must follow that Pompeii derived substantial income from other sources as well.

⁷ Jongman (1988: 207–73).

⁸ Wallace-Hadrill (1994: 72–82).

⁹ Robinson (1997).

UNDERSTANDING THE EVIDENCE

At the basis of the analysis of this chapter lies a database containing all fully excavated buildings of Pompeii and their rooms. Of the buildings, plot size and building type were recorded, and of the rooms, the database specifies whether they belong to a certain architectural type (e.g. atrium, peristyle, *tablinum*).¹⁰ This makes it, of course, possible to count the number of rooms per building, rank them according to room number and plot size, and see which buildings are more likely to have which features. It also makes it possible to count totals. Excluding the city's public buildings and some seventeen walled areas with no remains of domestic facilities, the database contains 1,130 independently functioning units. There are three key broad categories of buildings. First, there are houses, most of which have an atrium, a peristyle, or at least some form of inner courtyard: 498 units (43 per cent) in the database have been assigned to this category. The second group consists of *taberna* units, which are here defined as independent units organized around a *taberna*. There are 468 *taberna* units in the database (41 per cent). Thirdly, there are 133 apartments (12 per cent) which were directly accessible from the street and may be recognized through the remains of staircases. There is a small grey area between houses and *taberna* units but I have generally ranked those with only rooms behind each other as *taberna* units and those with a more complex structure as houses. Fifty-two units (4 per cent) resist clear architectonical categorization—most in fact are workshops or other commercial facilities. Together, these buildings have 10,214 rooms on the ground floor, including 413 *fauces*, 430 atria, 212 *tablina*, and 129 peristyles with three or four sides. Moreover, no fewer than 800 spaces that can be identified as a 'shop' are attached to these houses.¹¹

Measuring House Sizes

Wallace-Hadrill and Robinson primarily based their analyses on plot size. While this is not, in itself, a useless criterion, it is rather rough and causes quite a few problems when trying to make sense of house size. In the first place, plot sizes (and shapes) heavily depend on the initial subdivision of land by the government. As Schoonhoven has argued for region VI, it is still possible to recognize many initial allotments in the AD 79 subdivision of the *insulae*.¹²

¹⁰ The full database is available at <<http://www.mikoflohr.nl/databases/pompeii/>>, which provides both a rank-size chart of the properties, and a catalogue of the individual units.

¹¹ I use the word 'shop' here to avoid confusion with the *taberna* units: colloquially, both the room and the unit are referred to as *tabernae*. In this chapter, 'shop' refers to the room, *taberna* to the unit. In reality, of course, *tabernae* were multipurpose commercial facilities that also could function as workshops. On the form and function of *tabernae* see Holleran (2012: 99–158).

¹² Schoonhoven (2006: esp. 168–71). See, for a more substantial argument focusing on Herculaneum, De Kind (1998: 65–85).

While, occasionally, neighbouring plots would be merged, or rooms belonging to one house would be added to its neighbour by changing the position of the door, the dimensions and shapes of plots were fairly stable. This limited the scale of what could be built, but not necessarily also the number of rooms: by making rooms a little bit smaller, one could achieve (broadly) comparable domestic luxury on plots of different size. This is something one can also see at work at Pompeii, where, for example, larger atria tend to be surrounded by larger, but not necessarily also by more, *cubicula*. Secondly, relying only on plot size also necessarily involves making the assumption that land prices were equal throughout the city, which is extremely unlikely to have been the case: it is highly likely that land prices west of the Via Stabiana were much higher than in the eastern half of the city. Part of this is also suggested by the way land was being used: much of the excavated area east of the Via Stabiana is considerably less densely built up than the city centre. This also highlights a third problem: some plots of land, especially in the eastern half of the city, were used for horticulture and had rather modest domestic facilities compared to their size. These would have an unduly high place in relative rankings based on plot size only.

The alternative is to use the number of rooms. This is not without its problems either, but it has a couple of advantages. In the first place, while not entirely inflexible, the number of rooms is much more flexible than the size of a plot: one can change the layout of a building to use space more or less intensively and sometimes with limited interventions. Secondly, contrary to land price, the cost of building materials and construction is not directly dependent on the location of a building within the city, except where there were challenges due to locally specific circumstances, such as height differences. Moreover, the relation between number of inhabitants and number of rooms is, on average, much stronger than that between number of inhabitants and plot size: an analysis based on room number would, for example, immediately filter out the horticultural areas in the east of the city.

A major problem in any assessment of the Pompeian evidence is that it is extremely hard to reconstruct floors above the AD 79 ground level. Crucially, the situation differs considerably within the site, with upper floors being almost non-existent in areas excavated before 1860, fragmentarily known in areas excavated under Fiorelli and Sogliano, and relatively well known in parts of the *nuovi scavi* of the early twentieth century.¹³ In fact, the record is so corrupt that it would make no sense for a quantitative analysis of the Pompeian evidence to take the known upper floors into account. Hence, they have been left out. However, to include some notion of upper floors, which is particularly relevant in the case of small *taberna* units and houses which relied on space available on upper floors to be inhabitable, staircases have been included in the analysis.

¹³ On the question of upper floors see also Chapter 7 (this volume: 231–2).

They have been taken to stand for *at least* one room on the upper floor. While the upper-floor issue distorts the data to some extent, and makes it likely that the cumulative living area particularly of *taberna* units and upper-floor apartments is somewhat underestimated, it does not fundamentally alter the analysis.

Drawing Borders: On Rooms and Units

The present dataset is, like all large datasets, not without its biases and problems. One very basic problem is that it is often hard to decide what actually counts as a room. Simply following the numbering system established by *Pompei Pitture e Pavimenti* (PPP) does not work. Apart from the fact that the numbering has been done inconsistently, spaces numbered as a room occasionally turn out to be something entirely different, such as a basin or a bread oven.¹⁴ Moreover, some spaces that are numbered are actually too small to count as a room, but must be seen as storage space. In particular, this goes for the spaces carved out underneath staircases and for built-in cupboards.¹⁵ As a general rule, a space that is not big enough for a person to stand and sit in has not been counted as an independent room, but it is not always easy to judge this based on published reports. Furthermore, there is a structural problem with spaces colloquially labelled as *alae*: should they be counted as different rooms or should they be seen as part of the atrium? It has been chosen here to follow the convention and to include them in the database as separate rooms, as they add an extra functionality to the atrium and sometimes could be closed off. More problematically still, it is possible that, in some houses excavated early on, walls have gone unrecorded, so that what now seems one room was actually subdivided in a number of spaces.¹⁶ Such problems do, of course, have a negative impact on the quality of the dataset, but arguably only to a limited extent: in most houses, the overall situation is clear enough.

A second issue concerns the boundaries between units. It is important to emphasize that the units in the database are thought of as independently functioning households, not as independent, owner-occupied properties.¹⁷ Thus, to define units, the present analysis has started from the idea that any set of rooms that is only connected to itself and to the street must be seen as one independent unit, as was indeed the definition used by Wallace-Hadrill and Robinson.¹⁸ This

¹⁴ E.g. the rinsing basin numbered as 26 in house VI 8, 20–1.2, and oven 2 in bakery VI 6, 17.20–1.

¹⁵ E.g. cupboards 7, 8, and 11 in house VII 14, 5.17–19.

¹⁶ For example, in house VI 8, 20–1.2, the wall separating rooms 22, 23, and 25 has disappeared, and only features on plans. E.g. Flohr (2008: 1).

¹⁷ On this issue see Mouritsen (2011: 210), who rightly argues that property is hard to reconstruct based on the archaeological record, but seems to read our claim of ‘independence’ as households with complete socio-economic independence, rather than as households functioning more or less independently on an everyday basis.

¹⁸ Wallace-Hadrill (1994: 72–3); Robinson (1997: 136–8).

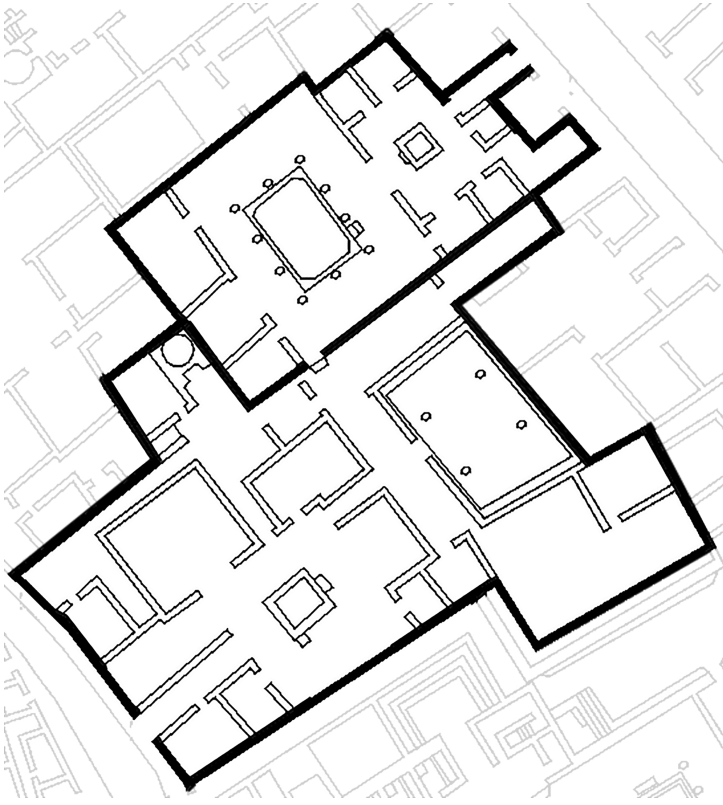


Figure 2.1 Plan of houses VII 1, 25 and VII 1, 46. Map: Miko Flohr.

also is the definition underlying the catalogues of Eschebach and VanderPoel.¹⁹ In practice, however, applying this definition to the material record turns out to be more problematic than perhaps expected. In the first place, there is, at least, theoretically, the possibility that adjacent units were connected through the upper floors. This may not often have been the case, but it can only very rarely be excluded. This means that the total number of units in our database may be slightly higher than, in reality, was the case, though it is unlikely to have distorted the data very seriously. Secondly, it may sometimes be too rigid to see all rooms that are internally connected as one unit: occasionally, one entrance clearly leads to two completely separate structures, as is the case with entrance I 3, 8, which leads to two small houses. Moreover, sometimes two almost completely separately functioning structures with independent entrances are connected at one, rather marginal, point (e.g. because they shared a garden, or a light well). An example is the situation with houses VII 1, 25, and 47 (Figure 2.1), which are

¹⁹ Eschebach (1993); CTP I–III.

connected at the back of each other's peristyles.²⁰ Should this complex be seen as one house, or are these two independently functioning households that were closely connected? Whereas some scholars have been rather strict in seeing such complexes as one whole, the present analysis has sometimes made different decisions in this respect, but this does come down to specific judgements about individual cases.

Missing Data

Finally, there is the problem of missing data, both in Pompeii itself and in its direct environment. Pompeii was excavated as a city surrounded by a wall circuit, but by the first century AD, and probably before that, the relation between the sixth-century BC wall circuit and the city had become fuzzy: as has already been mentioned, the eastern half of the area within the walls was urbanized only to a limited extent. Conversely, certain areas immediately outside the walls were relatively densely urbanized, as is particularly clear outside the Porta Ercolano and the Porta Marina. It is not entirely clear how large and populous these 'suburban' quarters were, and whether it should be assumed that they also existed outside the other gates, where excavations have not proceeded beyond the city wall. Particularly puzzling is the situation outside the Porta del Vesuvio, where nineteenth-century excavators seem to have found evidence suggesting the presence of a metal workshop north of the city wall, and outside the Porta Stabiana, where a suburb might be expected along the road between Pompeii and Stabia; yet whatever suburb there was here is hidden underneath the modern city.²¹ However, one should not overestimate the amount of people living in suburbs around Pompeii. In the first place, it is unlikely that there were densely urbanized areas immediately east of Pompeii, given the patterns of land use in the adjacent parts of the city itself. This seems to be confirmed by the layout of the necropolis along the Via di Nocera, which is surrounded by tombs only—a sharp contrast with the much more mixed land use around the road outside Porta Ercolano.²² Secondly, the dimensions of the suburbs outside the Porta di Ercolano, the Porta Marina, and the Porta Stabiana seem to have been fairly limited. It is likely that the suburb of the Porta Marina was limited to the direct environment of the Suburban Baths, and measured less than a hectare. The suburb outside the Porta di Ercolano may have continued along the road for some distance, but there is no evidence suggesting that it spread much beyond its immediate

²⁰ Cf. Wallace-Hadrill (1994: 74) on the Casa dell'Efebo (I 7, 10–12.19).

²¹ On the Porta del Vesuvio metal workshop see Grafts (1988: 12–48).

²² On the continuation of the Via di Nocera towards Scafati see De'Spagnolis Conticello (1994: 19–24).

surroundings. If it continued up to the Villa of the Mysteries, it may have measured some 2.5 hectares. The possible suburb outside the Porta Stabiana is likely to have been limited by the Sarno river in the south, and is unlikely to have extended much to the east as there is little trace of it around the Porta di Nocera. It is also unlikely to have continued in westward direction, as the major traffic axis ran southward towards the Sarno. Optimistically, it may have measured some 3.2 hectares. As to the Porta del Vesuvio suburb, it cannot have been larger than the one outside the Porta di Ercolano.²³ In total, the extent of the Pompeian suburbs is unlikely to have been substantially more than 10 ha, which, to judge from the excavated areas outside the walls, probably had a population density of well below the urban average. There is, thus, little doubt that the large majority of Pompeians lived within the town's walls.

A second problem obviously concerns the unexcavated parts of the city within the walls. It is hard to reconstruct what these looked like. A recent attempt to grasp the nature of urbanism in the eastern part of Pompeii through the geoelectric and magnetic survey of several unexcavated blocks in region III returned few tangible results except for the shape of the *insulae*.²⁴ The best indication of the land use in the unexcavated *insulae* is given by the façades on their north and south sides. Along the Via dell'Abbondanza, the façades of the unexcavated *insulae* belonging to regions III and IX more or less mirror the façades of the excavated *insulae* of regions I and II on the opposite side of the road both in the number and in the nature of doorways (Table 2.1). This may suggest that land use in these *insulae* was approximately similar to that in the eastern part of regions I and II. In practice, the unexcavated *insulae* may have been a little bit more densely built up as they were directly adjacent to the main east–west thoroughfares. Perhaps we should expect things, on average, to look a little like the row of *insulae* directly south of the Via dell'Abbondanza. These were relatively densely built-up *insulae* with some garden plots, many small houses, and rather few shops and apartments. This

Table 2.1 Entrances along the eastern part of the Via dell'Abbondanza

	South side (<i>insulae</i> I 6–9; 11–13; II, 1–5)	North side (<i>insulae</i> IX 7–13; III, 1–7)
<i>Tabernae</i>	24	23
Houses	44	38
Apartments	2	1
Other	2	2

²³ Two villas with an agricultural function have been found rather close to the Porta del Vesuvio. See Oettel (1996: 204–6, fig. 30); Moormann (2007: fig. 28.1). *NSc* (1899: 236–9; 1900: 599).

²⁴ Di Fiore and Chianese (2008).

Table 2.2 Reconstructing the missing *insulae* of Pompeii. Where two figures are separated by a slash, the left figure indicates the number of units, the right one the number of rooms

	Pompeii	Via dell'Abbondanza <i>insulae</i>	Unexcavated <i>insulae</i>	Total
Surface	46.18 ha	4.94 ha	16.79ha	62.97 ha
Houses	498/8,589	57/855	194/2,905	692/11,494
<i>Taberna</i> units	468/1,293	19/58	65/197	533/1,490
Apartments	133	2	7	140
Other	52/332	5/85	17/289	69/621
Total	1,151/10,214	83/998	283/3,391	1,434/13,605

also shows in the statistics: of the eighty-three independent units in these thirteen *insulae*, fifty-seven are houses, while there are only nineteen *taberna* units, and no more than two apartments. Houses are also slightly smaller than average. It is reasonably useful to start from these *insulae* to fill in the 'missing parts' of Pompeii within the walls. They cover an area of 4.94 hectares, whereas the unexcavated *insulae* in total cover an area of 16.79 hectares. One thus needs to multiply the figures for the Via dell'Abbondanza *insulae* by $16.79 / 4.94 = 3.396$ to come to a rough estimate of what is still hidden underneath the *lapilli*. This would lead to a hypothetical number of 194 houses (with 2,905 rooms), sixty-five *taberna* units, seven apartments, and seventeen uncategorized buildings, resulting in a theoretical total of 1,408 units for Pompeii in its entirety (Table 2.2). Compared to what has been excavated, there would be a slightly higher proportion of houses at the expense of the *taberna* units and the upper-floor apartments.

POMPEII AND ITS POPULATION

Based on these hypothetical totals it becomes possible to repopulate the urban core of Pompeii. As Wallace-Hadrill argued, there are essentially two key approaches to the evidence: one based on the number of houses, assuming an average number of people living in each house, and the other based on the number of rooms, assuming an average number of people living in each room.²⁵ In what follows, both approaches will be discussed. The argument will start from the approach based on households, while the approach based on the number of rooms will be used to test to what extent the results yielded by this method are credible.

²⁵ Wallace-Hadrill (1994: 100).

Households and their Sizes

In discussing the sizes of households, it makes sense to start with the four types of units as they seem to represent different types of households. For the *taberna* units it has to be taken into account that an unknown number of them were uninhabited, with shopkeepers living elsewhere, in houses or apartments. Most other *taberna* units were very small and cannot have accommodated a lot of people. In general, it is hard to imagine many *taberna* units being inhabited by more than four to five people, partially because the small-scale businesses in these shops would rarely have been able to support more. Moreover, it is hard to imagine that people occupying *taberna* units, many of whom may have been freedmen, had the resources to buy themselves slaves, which probably leaves us, in the large majority of cases, with a household consisting, at *some* point in its life cycle, of one man, one woman, and a couple of children. An average of four people per *taberna* probably means overestimating the number of people living in these units quite dramatically. It would lead to a hypothetical maximum of $533 \times 4 = 2,132$. A pessimistic estimate, assuming that a quarter of all *taberna* units did not have any living accommodation, and that the others on average counted only three people would lead to $0.75 \times 533 \times 3 = 1,199$ people living in *tabernae*.

For the upper-floor apartments, the average number of inhabitants cannot have been much higher than that of *taberna* units, though it is more likely that most or all of them were inhabited. Still, it is unlikely that many households occupying these apartments owned a lot of slaves. Taking five as the average for all 140 apartments probably therefore borders on the overly optimistic. This would mean $140 \times 5 = 700$ people living in upper-floor apartments. Two, however, seems the absolute minimum, especially if one takes into account pre-industrial birth rates. This would mean 280 people.

Households inhabiting houses should, on average, be significantly larger than those inhabiting *taberna* units or apartments, but they are likely to have varied enormously in size. The smallest households may have been as small as those inhabiting *taberna* units or apartments, while the largest ones may easily have counted thirty to forty people. In Roman Egypt, where houses and households are likely to have been smaller than in Pompeii, papyrological evidence suggests houses were inhabited by slightly fewer than eight people on average.²⁶ This seems a reasonable starting point for a minimum scenario. In practice, this might be, for example, a mother, a father, one of their four parents, three children, and two slaves. For a maximum scenario, we would need to make this number higher, for example by adding a couple of other family members living in, and particularly by adding slaves; however, flexibility is not unlimited,

²⁶ Alston (2002: 70).

Table 2.3 Constructing the population estimate

	<i>Taberna</i> units	Apartments	Houses	Other buildings	Total
Minimum	1,199	280	5,536	276	7,291
Maximum	2,132	700	8,304	621	11,757

especially since one has to take into account issues of demography and mortality, which imply that, at any given moment, at least some houses were underpopulated. Most houses were also relatively small—as will appear when discussing inequality later this in chapter, the group of extremely large houses is numerically marginal. Perhaps an average of twelve people is a reasonable upper limit. This would mean that the hypothetical number of people living in Pompeii's houses is likely to have been between 5,536 and 8,304.

The sixty-seven buildings belonging to the fourth group (Table 2.2, 'Other') are hard to understand. A relatively large proportion of them was uninhabited, while some others were relatively large, but did not necessarily have a primarily domestic function. A pessimistic scenario could perhaps start from the assumption that 50 per cent were inhabited, and that these contained, on average, households equal in size to those inhabiting houses, which leads to an average of four inhabitants per unit. An optimistic scenario might see three-quarters inhabited in the same way, which would then lead to eight inhabitants per unit on average. Yet the numbers are so small that the total effect is limited. In the pessimistic scenario, 276 people live in these buildings, in the optimistic scenario, 621.

As follows from Table 2.3, the population of Pompeii emerging from this analysis is between slightly over 7,250 people, and 11,750 people. The minimum estimate is lower than the 8,000 suggested by Eschbach, whereas the maximum estimate is close to the estimates by both Fiorelli and Storey. In the light of past debates, our pessimistic scenario seems more robust as a lower limit than our optimistic scenario as an upper limit. For a maximum, 11,750 people living in Pompeii may be on the conservative side. Arguably, the key factor in the analysis is the number of Pompeians living in houses, as this is, in both scenarios, the vast majority of people. It is therefore important to test whether the maximum average of twelve inhabitants per house is in fact not too low. This brings us to our second approach to Pompeii's population: the analysis of room numbers.

Populating Rooms

Our reconstruction of the Pompeian record resulted in a hypothetical total of 13,605 rooms. Obviously, this cannot be directly translated into a number of inhabitants, particularly because the database only includes rooms on the

ground level and leaves out upper floors. Thus, all apartments in the database have zero rooms, and of many *taberna* units only the shop and a staircase were included. For upper-floor apartments and *taberna* units alike, any estimate is basically dependent on our assumptions about household size. The *taberna* units in our dataset have a reconstructed amount of 1,490 rooms, which would mean an occupancy of 0.80 person per room in our pessimistic scenario and 1.43 in our optimistic scenario. Neither figure is inconceivable, but it seems hard to go much higher than an overall average of 1.5 persons per ground-floor room, given the fact that most ground-floor rooms were devoted to commercial activities and accounting for the number of *taberna* units that were not inhabited. Both boundaries are thus, roughly, credible.

The number of rooms is much more important when it comes to houses, particularly because the differences between the number of rooms on the ground floor of houses are much more pronounced than they are with *taberna* units. The smallest house has just four rooms, while the largest one has seventy-eight.²⁷ The hypothetical 692 houses have a hypothetical number of 11,494 rooms, which is an average of 16.62 rooms per house, though the median is only fourteen rooms. These estimates would result in a minimum occupancy of 0.48 persons per ground-floor room and a maximum occupancy of 0.72 persons per room. A median-sized house of fourteen rooms—such as, for example, the Casa del Principe di Napoli (VI 15, 8) or the Casa dei Ceii (I 6, 15)—would then have some six or seven inhabitants in the conservative scenario, and ten or eleven in the more optimistic scenario. The former figure may seem on the low side for an average, but is not completely inconceivable; the latter figure, however, seems not unreasonable—and thus is more problematic as an upper limit. Indeed, in his discussion of Pompeii's population, Wallace-Hadrill flirted with an average of one person per room based on parallels with studies of early modern houses.²⁸ This would lead to an average of more than sixteen people per house. As Wallace-Hadrill already argued, however, this is too high: especially in the case of the largest Pompeian houses, it would lead to households of a size that stands in no relation to basic facilities such as toilets and kitchens. Indeed, even counting 0.75 persons per room, a complex like the Casa del Fauno (Figure 2.2) would theoretically house around thirty-seven people. This is perhaps not physically impossible if many of these people slept on the upper floor, but it clearly is not what the kitchen and the limited sanitary facilities seem to have been designed for. Especially in the larger houses, a relatively large proportion of rooms also had representative functions, or mainly played a role in the domestic traffic system. Such spaces do not say so much about the total

²⁷ The smallest houses are I 4, 11 and VI 3, 12—they both look like *tabernae* but have a much more complex structure behind the shop, suggesting they were laid out as small houses. The largest house is the Casa di Fabius Rufus (VII 16, 20).

²⁸ Wallace-Hadrill (1994: 100).

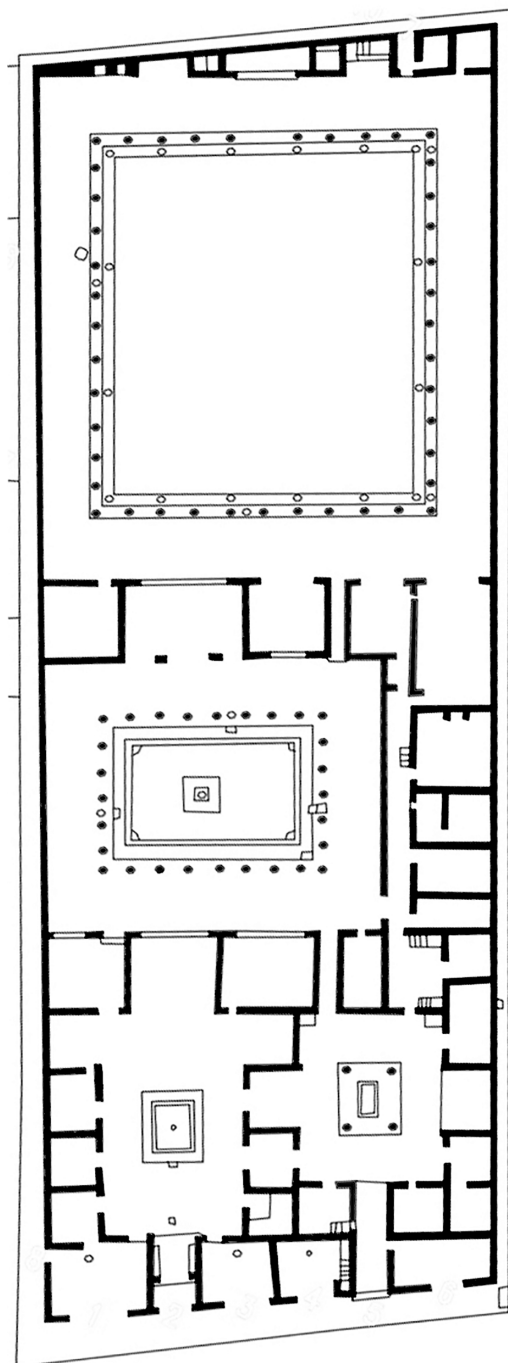


Figure 2.2 Plan of the Casa del Fauno (VI 12, 2).

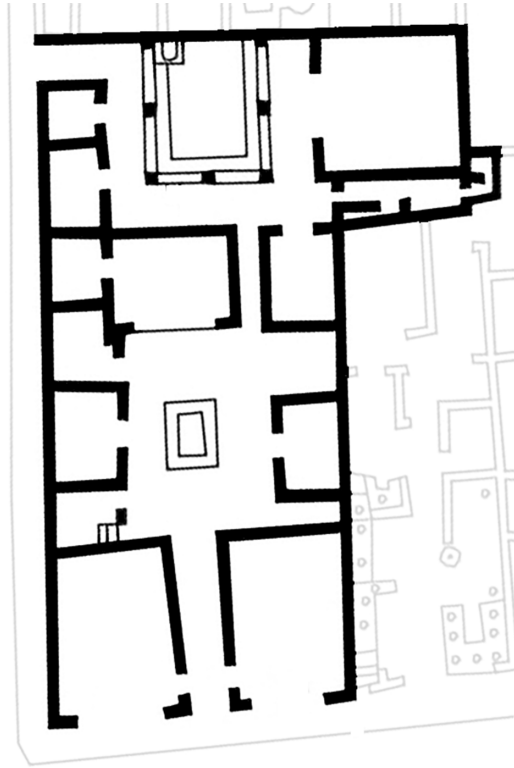


Figure 2.3 Plan of the Casa del Poeta Tragico (VI 8, 3–6).

amount of inhabitants of the house, but rather about the way they organized their domestic life. This is especially true for rooms adjacent to gardens or peristyles, and for circulation spaces such as atria, peristyles, porticoes, and corridors, but also for shops with a direct connection to a house. In the case of the Casa del Fauno, twenty-two of the forty-nine rooms can, in some way or another, be seen as not indicative of household size.²⁹ As there only seems to have been an upper floor above the south-east quarter of the house, it is not so easy to populate the complex with more than thirty-seven people, let alone to assume that *all* similarly sized complexes on average had a number of inhabitants that was substantially higher. Similarly, a much more modest house like the Casa del Poeta Tragico (Figure 2.3) has at least nine non-indicative spaces (out of twenty).³⁰ Fifteen

²⁹ See, for a similar approach, Wallace-Hadrill (1994: 100). These twenty-two rooms include shops 1 and 2; atria 7 and 27; *tablinum* 33; *fauces* 7 and 18; vestibules 26 and 52; corridors 16, 19, and 38; peristyles 36 and 40; the private bath in rooms 22 and 23; kitchen 24; *oecus* 25, 43, 42, 37, and 44.

³⁰ These include the two shops at VI 8, 4 and VI 8, 6, *fauces* 1, atrium 3, *tablinum* 8, *oecus* 15, peristyle 10, and corridors 9 and 16.

inhabitants seems a reasonable maximum scenario in this case, again because there is not enough space available on the upper floor to compensate for the atrium, the peristyle, the shops, the *fauces*, the *oecus*, and the *tablinum*. Thus, especially if we take into account the point that, purely for demographic reasons, not all Pompeian houses will have been occupied to their maximum capacity, an upper limit of around 0.75 persons per room on average seems defensible.

Dealing with the Suburbs

If we accept *c.*7,250 and *c.*11,750 as reasonable lower and upper limits for the number of people living within Pompeii's town walls, we can discuss what this means for the total urban population of Pompeii: How many people were living in the approximately 10 ha occupied by the suburbs? The only straightforward way to calculate this is to start from the population density within the town walls, which is about 116 people per hectare in our lower estimate, and about 187 people per hectare in our higher estimate.³¹ In a pessimistic scenario, we could perhaps assume that population density was about a third of that of the urban area within the walls, which would bring us to about 385 people living in the suburbs; in an optimistic scenario, we could—perhaps unrealistically—assume that population density was *as high* as it was within the walls, which would lead to a figure of 1,867 people. Adding this to the people living within Pompeii's walls, we arrive at a low estimate of 7,677 people, and a high estimate of 13,624 people. Avoiding false precision, it seems safe to say that Pompeii's total urban population was somewhere between 7,500 and 13,500 people; any population estimate significantly below or above these boundaries must be seen as unrealistic.

CITY AND COUNTRYSIDE: ON THE HINTERLAND OF POMPEII

The question is, of course, to what extent these figures can be explained from Pompeii's economic hinterland. The dimensions of Pompeii's territory have been the subject of debate since the late nineteenth century: Nissen and Beloch reconstructed a political territory of around or below 100 km².³² Jongman

³¹ Lower estimate: 7,291 people/62.97 ha = 115.79 people/ha; higher estimate: 11,757 people/62.97 ha = 186.71 people/ha. On urban population densities and Pompeii see also De Ligt (2012: 234) and Wilson (2011: 172).

³² Nissen (1877: 375–6) argued for a territory of between 80 and 110 km²; Beloch (1890: 17–18) postulated a territory of 1.75 *geographische Quadratmeile*, which is the equivalent of 96.4 km².

rightly argued that this does not necessarily also constitute the town's economic territory, and claimed a hinterland of 200 km².³³ However, as Purcell rightly argued, this is probably too much. Starting with a Thiessen polygon and taking into account the neighbouring hinterlands of Herculaneum, Nola, Nuceria, and Stabiae, Purcell reconstructed an economic hinterland of around 130 km², from which some 15 km² of steep Vesuvian slopes would need to be deducted (Figure 2.4).³⁴ A 'natural' hinterland of around 115 km² seems a credible starting point. To what extent was this natural hinterland able to feed Pompeii?

In absolute terms, if one assumes Pompeians all lived at subsistence level they would, following earlier estimates, need some 200 kg of wheat per person per year, which could then be supplemented by calories from wine, olives, and possibly fish.³⁵ In our most conservative population scenario, this comes down to 1,500 (metric) tonnes of wheat per year for Pompeii alone; in our most optimistic scenario, this would mean 2,700 tonnes. To understand how this relates to the carrying capacity of Pompeii's territory, four variables are of key importance. First, the amount of people living in the countryside, as these also rely on the territory for their own food, and need the same minimum amount of wheat per person per year. Pre-industrial urbanization rates are thought to have been significantly below 25 per cent on average, but they may have been slightly higher in exceptionally fertile areas—like Campania.³⁶ A second factor is the percentage of the territory that actually was used as farmland: even in the countryside, one will typically lose space devoted to farmsteads, roads, rivers and streams, and other forms of non-agricultural land use. If we assume the net amount of farmland that could be used for cereal production was 75 per cent of the territory (i.e. 86.25 km²), we are probably overestimating this, and underestimating the amount of land needed to grow the necessary quantities of vines and olives.³⁷ Thirdly, there is the yield/seed ratio, which strongly depended on the quality of the soil. As Campania, including the Sarno valley, was famous for its fertility, it seems possible to assume a seed/yield ratio of about 1:8 in normal years.³⁸ Starting from the traditional sowing ratio of five *modii* per *iugerum*, or c.132 kg/ha, it is perhaps possible to envisage yearly

³³ Jongman (1988: 107).

³⁴ Purcell (1990: 112).

³⁵ Hopkins (1978: 66–7) reconstructed a yearly amount of 250 kg wheat *equivalent* per person, per annum. This could easily be translated to approximately 200 kg net wheat consumption, supplemented by a limited amount of other foodstuffs. Cf. Jongman (2007a: 598–9).

³⁶ See, on ancient urbanization rates, Lo Cascio (1994: 39). For Roman Italy, excluding Rome, see Morley (1996: 182); Hopkins (1978: 68–9); De Ligt (2012: 196–200), all working with an urbanization rate of 25% or lower as an average. De Ligt (2008: 154–60) works with an urbanization rate of 15% for Cisalpine Gaul.

³⁷ Purcell (1990: 115), deconstructing Jongman's account of agricultural productivity, uses two-thirds: 100 km² of a territory of 150 km², the latter of which is Jongman's figure (1988: 134).

³⁸ Cf. Goodchild (2007: 247–9). Jongman (1988: 135) assumes just 500 kg per ha per year.



Figure 2.4 Thiessen polygon indicating Pompeii's natural economic hinterland. Map: Miko Flohr.

yields of c.1,050 kg per hectare.³⁹ In the most optimistic scenario, the territory of Pompeii would have been able to produce 9,100 tonnes of grain each year, which would be enough to feed about 45,500 people at subsistence level. This is easily compatible with our lower estimate: the 1,500 tonnes of grain needed to feed these people at subsistence level would theoretically allow for an urbanization rate as low as 16.4 per cent. Yet our higher estimate appears more problematic: it would result in an urbanization rate of at least 29.6 per cent—at subsistence level. In other words, assuming an unrealistically low consumption, very high yearly yields, and a highly efficient land use, Pompeii's natural territory is *just* able to support the population of the city in our highest estimate—if we allow for a very high urbanization rate. It should be noted, though, that the present model does not take into account the possible existence of secondary population centres within Pompeii's territory, such as the epigraphically attested Pagus Augustus Felix Suburbanus, and a possible settlement around the port in the Sarno estuary.⁴⁰ However, most problematic of all, of course, is the fact that Pompeii does not at all seem to have been a bare-bones city with all people living at or around subsistence level. This raises the issue of inequality: if it is inconceivable that, in a stable population, many people structurally live *below* subsistence level, the consequence is that any observable inequality implies an aggregate demand above subsistence level.⁴¹

DIFFERENTIATION AND INEQUALITY

As several scholars have made clear, the Roman world was no egalitarian world: economic differences within communities were significant, affecting not only people's personal access to certain consumer goods, but also the structure and, to some extent, volume of urban demand as a whole.⁴² The question, of course, is to what degree inequality is archaeologically not only visible but also measurable in Pompeii. The difficulty, of course, lies in the fact that we have no reliable data on income inequality; the material remains of the city do, however, provide some rather clear indications for wealth inequality, and, more indirectly, for the consumer behaviour of households.

³⁹ On the sowing rate see Goodchild (2007: 249–53); cf. Purcell (1990: 115): 140 kg/ha.

⁴⁰ On the Pagus Augustus Felix Suburbanus see *CIL* 10.814, 853, 924, 1042 (from Pompeii); *AE* 1890, 45 (from Scafati). On the debate about the port of Pompeii see the Introduction (this volume: 5).

⁴¹ On this issue and the so-called inequality possibility frontier see Milanovic, Lindert, and Williamson (2011: 256–9).

⁴² See esp. Scheidel and Friesen (2009); see also Jongman (2007b: esp. 508).

Household Types

Of course, the most straightforward distinction to be made within the archaeological record is according to household types—in general, *taberna* units and apartments may be expected to have provided accommodation for different kinds of people with a varied, generally more modest, socio-economic position than houses did. It is thus relevant to see what proportion of the population probably lived in which kind of accommodation. Interestingly, the percentages vary only marginally between our minimum and maximum estimates, and point to a rather large majority of above 70 per cent of the entire population living in ‘houses’, while 15–20 per cent of all people lived in *taberna* units, and around 5 per cent in upper-floor apartments (Table 2.4); the non-categorized units are in the same range as the apartments. It is very hard to get percentages significantly bigger or smaller than these, and the proportion of the population living in *taberna* units may be on the high side given the uncertain number of uninhabited units of this type. The question is whether we are to infer differences in relative buying power between and within these building types.

The *taberna* units seem the most homogeneous group: there appears to have been little variation in their dimensions. Given the small size of these units, one may expect the average income, and therefore buying power, of the people inhabiting them to have been the lowest in the city—with households primarily depending on the not necessarily predictable income from the shop for their wants and needs, and relying on ties of patronage in more difficult times.⁴³ We do not know a lot about the domestic inventory of *taberna* units because of our poor knowledge of upper floors and the bad recording practice during excavation, but it seems clear that there was not a lot of luxury in these households. Upper-floor apartments essentially seem to have been similar in this respect, though this group may have been more varied and lacks the clear economic basis of a shop. Certainly, the *cenacula equestria* mentioned in the inscription from the Insula Arrianna Polliana may seem to have had a certain grandeur, but this should not be overestimated, and, in reality, most apartments appear to have been rather small.⁴⁴ Thus, if Pompeii

Table 2.4 Percentage of the population per building type

	<i>Taberna</i> units	Apartments	Houses	Other buildings
Minimum	16.55%	3.92%	75.77%	3.75%
Maximum	18.24%	6.08%	70.44%	5.24%

⁴³ On the unpredictable fluctuations in demand in retail see Hawkins (2012: 182–4).

⁴⁴ Pirson (1999: 23–47).

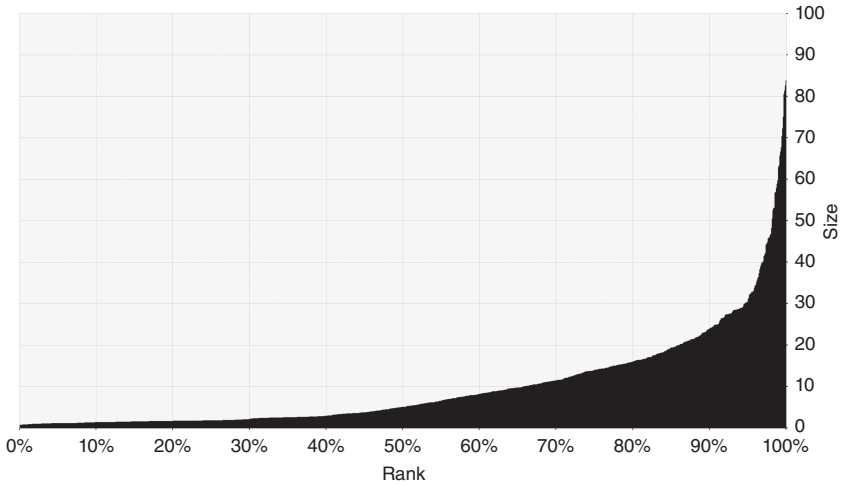


Figure 2.5 Rank-size graph of Pompeii's inhabitable units. Graph: Miko Flohr.

had a real 'lower class' in an economic sense of the word, it was to be found in the *taberna* units and in the apartments, and it comprised some 20–25 per cent of the population. Again, however, it is important to emphasize that this is a social minimum that has no intrinsic relation to subsistence. Indeed, those *taberna* units with more rooms on the ground floor sometimes had living rooms with banqueting equipment or even painted decoration on the walls; that the same could be true in upper-floor rooms is suggested by evidence from Herculaneum.⁴⁵ Moreover, the close relation of many *taberna* units and apartments with atrium houses suggests that many inhabitants of these units maintained close ties with groups higher up the socio-economic ladder.

The houses as a group are, of course, much more varied. The smallest ones are just a little bit bigger than *taberna* units, with only five or six rooms, which means that there is essentially a continuum from the smallest *tabernae* to the large urban villas of the local elite (Figure 2.5).⁴⁶ It would be logical to assume that gross buying power of households increased with house size, as the

⁴⁵ E.g. the apartments on the upper floor of the Casa a Graticcio. Cf. Maiuri (1958: 416–20); De Kind (1998: 116).

⁴⁶ The units included in Figures 2.5, 2.7–9, and 2.11 have been ranked from small to large based on a score that incorporates both room number and plot size. The score for each house (x) was computed with the formula $x = 100 \times ((\text{room number} / \text{max. room number}) + (\text{plot size} / \text{max. plot size})) / 2$. This leads to a score between 0 and 100; the highest room number is 78 (Casa di Fabius Rufus); the largest area is 2,809 (Casa del Fauno). It should be observed that rank/size graphs based on either room number or area look more or less similar in shape, and scatters of evidence projected on them look *broadly* similar.

number of people living in these houses increased accordingly, but one also may expect that per-capita buying power was positively related to house size. Crucially, however, there does not really appear to have been a clear subdivision in wealth groups: Pompeian society may have been unequal, and, socially, deeply divided according to individual socio-economic statuses, but it was not really a very neatly stratified society as households were relatively equally divided over a wide spectrum from relatively poor through relatively wealthy to extremely wealthy.

Measuring Pompeian Inequality

The question is what effect this inequality had on the Pompeian consumer economy. Of course, the relation between house size and buying power is not completely straightforward. Some wealthy families may have maintained a small pied-à-terre at Pompeii alongside a much larger *domus* elsewhere. More problematically, individual households may have enriched themselves considerably without moving or enlarging their house; conversely, they also may have become impoverished without it being clearly visible in the archaeological record. Such micro-scale fluctuations are natural and are likely to have averaged out on the macro-scale level; in general, access to property is likely to be roughly proportional to buying power in relative terms. Indeed, to some extent, consumer behaviour is reflected in the architecture and decoration of Pompeian houses: rather than being rigidly planned, many Pompeian houses grew organically and were decorated and redecorated at several points in time. Choices about building, changing, or redecorating a house can be seen as indicative of consumer behaviour and thus as a proxy for the Pompeian consumer market. Analysing these choices is therefore crucial for our understanding of Pompeii's economy, and for the effect of economic inequality on the urban consumer market.

A key issue is the relative position of the economic elite. If the elite comprised a very small group, which, in economic terms, was isolated from the rest of the population in the sense that they were much wealthier, demand for luxury consumer goods would be limited, and there would only be a very limited trickle-down effect, where the less well-off could hope to incorporate elements of the elite lifestyle in their own lives to participate in the social game of image and status.⁴⁷ On the other hand, if the elite group was bigger in size, or the buying power of the rest of the population only a little lower, the market for elite consumer goods could be much bigger. In other words: the nature of social differentiation is likely to have a large impact on the consumer economy

⁴⁷ On trickle-down effects in Pompeian domestic decoration see Wallace-Hadrill (1994: 149–74).

of a city. This is a point that has, in a slightly different way, also been made by Scheidel and Friesen in their 2009 article on the distribution of income in the Roman Empire as a whole. They simplified it to a choice between a dichotomous model, in which there were a few super-wealthy people and a large mass of undifferentiated poor, or a more nuanced model, in which there were middling groups and a 'more finely gradated continuum from wealth to indigence'.⁴⁸ Scheidel and Friesen propose, for the Roman world as a whole, a model that emphasizes a dichotomy between rich and poor, and assumes an extremely small but exceptionally wealthy elite of up to 1.5 per cent of the population, and middling groups that, though economically important, were numerically limited in size, including no more than 10 per cent of the entire population. Of the rest of the population, 80–85 per cent are supposed to have lived just above, close to, or below subsistence level.⁴⁹

It will be argued here that this schematic, dichotomous model, perhaps predictably, fits uneasily with the evidence from Pompeii. The rank-size distribution of all units by room number in Figure 2.5 shows a clear peak towards the right that represents the urban villas of the elite, and it is true that the peak includes, roughly, the top 5 per cent of the Pompeian housing stock, which theoretically could include a tiny elite, and a small group of sub-elite households with increased buying power, as suggested by Scheidel and Friesen. It is also true that Gini indices, based on house size and room number are 0.621 and 0.536 respectively, suggest significant wealth inequality (Figure 2.6); indeed, these figures are comparable to some of the estimates based on papyri that Scheidel and Friesen used to support their 0.42–0.44 Gini coefficient for income inequality for the Roman world.⁵⁰ However, an analysis of the distribution of certain architectural and decorative features clearly suggests that non-elite groups tended to have substantial buying power, which allowed them to invest in considerable domestic comfort, albeit sometimes in a compromised way. The evidence certainly contradicts the idea that a large proportion Pompeii's households lived close to the bare-bones minimum.

Inequality and Consumption

One way to look at this is through analysing the social spread of atrium and peristyle. The atrium is, exactly as one would expect, the standard element in Pompeian domestic architecture. Not all houses have an atrium, but many do, and there is no real distinction between smaller and larger houses (Figure 2.7), except for the very smallest houses, which often lack real atria, and the very largest houses, which may have two atria. Conversely, the peristyle—defined

⁴⁸ Scheidel and Friesen (2009: 62).

⁴⁹ Scheidel and Friesen (2009: 83–4).

⁵⁰ Scheidel and Friesen (2009: 85–6).

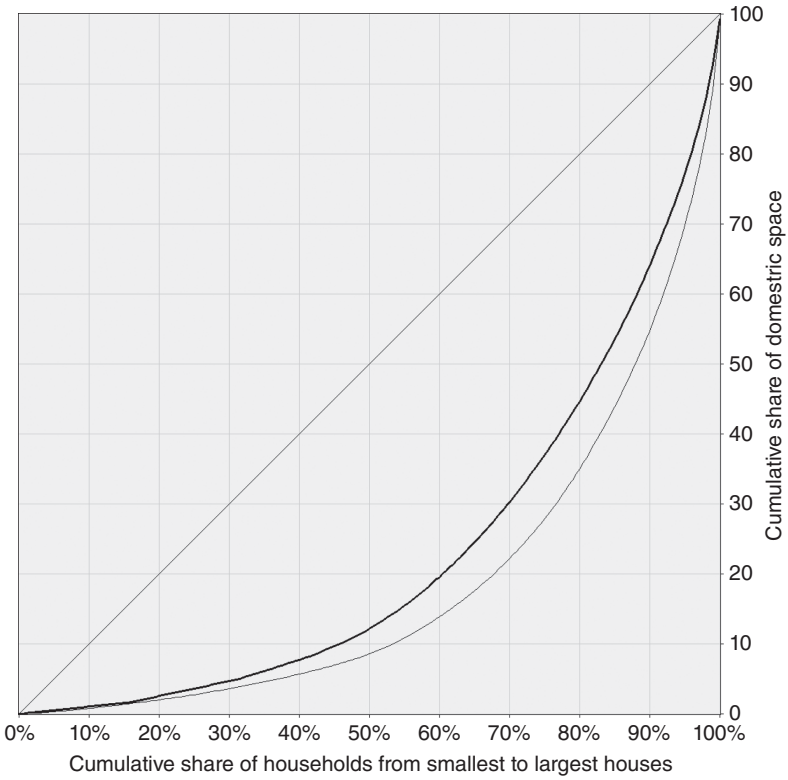


Figure 2.6 Lorenz curves of Pompeii's inhabitable units based on surface (thin line) and room number (thick line). Graph: Miko Flohr.

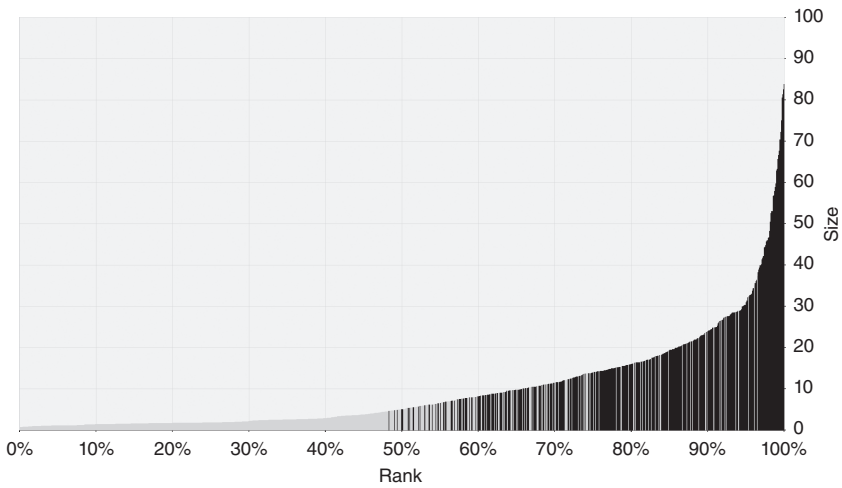


Figure 2.7 Spread of atria over Pompeii's inhabitable units. Graph: Miko Flohr.

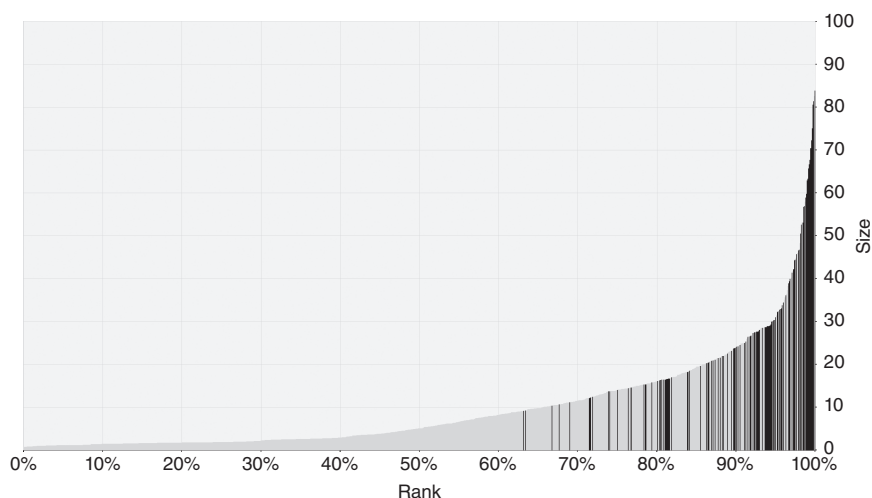


Figure 2.8 Spread of the peristyle over Pompeii's inhabitable units. Graph: Miko Flohr.

here as a three- or four-sided portico surrounding a garden—is much more unequally distributed, and much more concentrated in the upper half of the distribution chart (Figure 2.8). The peristyle is absolutely canonical in the upper 10 per cent of houses, common but much less frequent in the 15 per cent immediately following, but rare below the 75 per cent mark: only thirteen of the 114 units with a peristyle do not belong to the top 25 per cent of Pompeii's property stock. Arguably, the presence of a peristyle in the house is, to some extent, indicative of the economic behaviour of a household. It relates to a certain lifestyle, which included an array of expenses for banqueting, garden maintenance, water features, and art that is characteristic of Roman elite culture and is not to be found, or found to a much more limited extent, in houses that were not equipped with a peristyle. The peristyle is thus closely linked to what one might call an elite pattern of consumption.⁵¹ The chart indicating the spread of the peristyle (Figure 2.8) gives one indication of the degree to which this pattern of consumption spread throughout the Pompeian population.

It may be argued that the evidence suggests that regular access to the full package of elite consumption was mostly restricted to the wealthiest 10 per cent of Pompeian households. Beyond that group, access was more limited and, probably, in many cases, imperfect. Demand for elite consumer goods appears, on average, to have been lower below the wealthiest 10 per cent. It was not, however, non-existent. This becomes clear if we relax our criteria for peristyle identification and also highlight the houses with a one- or two-sided

⁵¹ See also Robinson (1997: 138–40); Wallace-Hadrill (1994: 82–7).

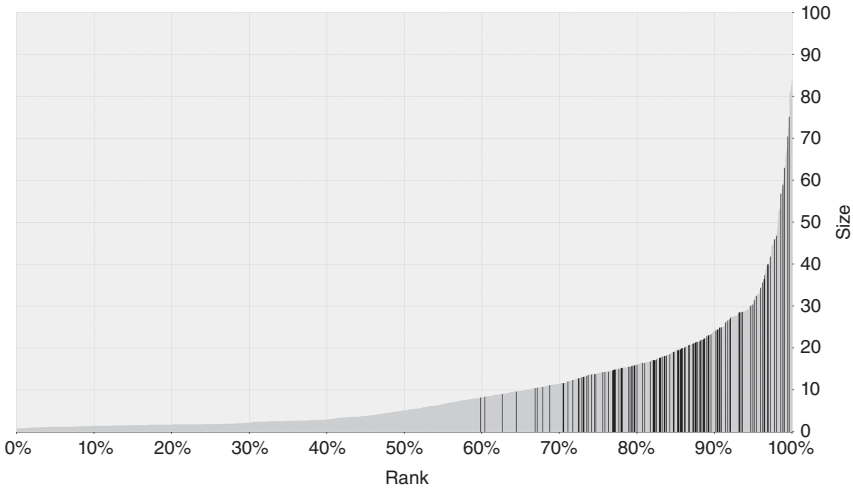


Figure 2.9 Spread of one- or two-sided colonnades over Pompeii's inhabitable units. Graph: Miko Flohr.

colonnade (Figure 2.9). These colonnades may be seen as related to a more compromised version of the elite consumption package, and one that was more widely available. Their spread suggests that the upper 25–30 per cent of Pompeian households were likely to have had regular access to the consumer goods commonly associated with elite culture to some extent.

Thus, to judge only from the spread of peristyles and colonnades, it already appears that Pompeii had a substantial local market for elite consumer goods: this clearly was not a 'subsistence city', nor a city of many poor households and a few rich ones. It could, however, be argued that the peristyle record is chronologically problematic in the sense that peristyles were being constructed at Pompeii from the mid-second century BC right until AD 79, and that many households inhabiting houses with 'early' peristyles may no longer have had the buying power associated with the architecture of their house.⁵² This indeed is a possibility, but it should be noted that a large majority of the older peristyles and porticoes seem to have been well maintained, and that the rooms surrounding them often sported the latest fashion of wall decoration. Moreover, the fact that so many medium-sized houses were adorned with peristyles throughout this long period actually suggests that sub-elite access to the elite lifestyle on average was actually rather stable from the late Republic onwards. That is, when people decided to build these peristyles and porticoes, they were expecting to have the means to use them accordingly.

⁵² On the history of the peristyle in Pompeian domestic architecture see Dickmann (1997; 1999: 127–58, 347–74).



Figure 2.10 Casa del Poeta Tragico (VI 8, 3–6), *oecus* 15: picture of Theseus abandoning Ariadne. Photo: Miko Flohr.

That sub-elite demand for elite consumer goods was still extant in the mid-first century AD can be argued on the basis of another dataset: panel-pictures in fourth-style wall decoration (Figure 2.10). The inclusion of such pictures—often showing scenes from mythology—added considerably to the decoration costs of a room, and it may be suggested that the degree to which households had access to these elements reveals something about their buying power, and about the degree to which they had access to the elite lifestyle.⁵³ A rank-size-distribution chart highlighting the complexes with panel-pictures shows that basic access to this form of decoration actually was rather widespread (Figure 2.11): many smaller houses had one or more rooms with panel-pictures, though the emphasis lies with the elite. These pictures were thus a form of art to which a relatively large minority of the population had access, and were certainly widespread outside elite circles.

Looking at the shape of the rank-size chart and at the spread of peristyles and wall paintings, it seems safe to say that Pompeii's elite included the households inhabiting the largest 5 per cent of houses: these houses were not only much larger than the rest, they were also well equipped for a luxurious elite lifestyle. Yet, underneath this narrow group, was a not insignificant sub-elite of households who had regular access to some, but not all, elite items. These middling

⁵³ On the production of these paintings see Esposito (2009).

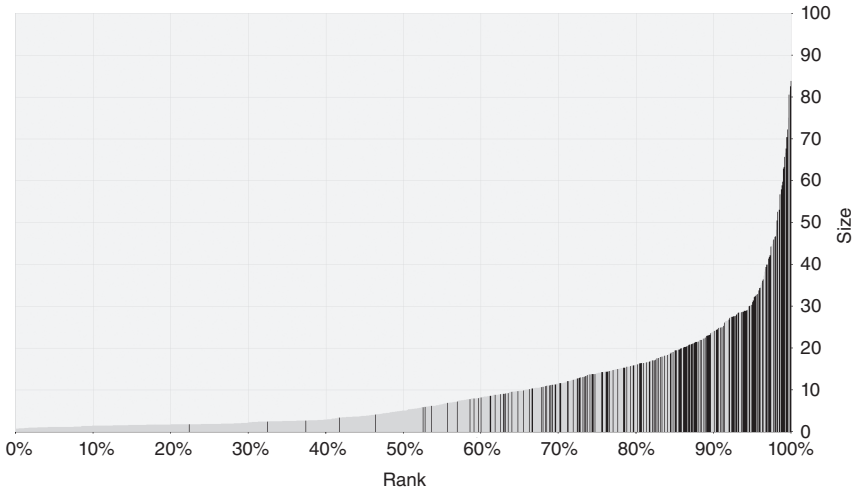


Figure 2.11 Spread of panel-pictures over Pompeii's inhabitable units. Graph: Miko Flohr.

groups included, roughly, the next 25 per cent. Below the top 30 per cent, the differentiation in house size, and the frequent traces of basic decoration even in *taberna* units, suggest that it is hard to see these households all as poor, or close to subsistence. This picture is markedly different from Scheidel and Friesen's dichotomic model: both the elite and the middling groups are much larger in terms of households, and—if it is true that the size of households on average is related to the size of houses—even larger still in terms of people, though we cannot know how wealth was divided within households. A schematic 'few rich'/'many poor' dichotomy clearly does not quite work for Pompeii. Of course, this does not necessarily invalidate the picture of inequality painted by Scheidel and Friesen for the Roman world as a whole, but it qualifies the extent to which it can be used to understand socio-economic stratification in specific contexts, and particularly within cities.

DISCUSSION

The key point that follows from this discussion is that if a substantial proportion of Pompeian households had a buying power considerably above subsistence level, and if many had access to forms of luxury and elements of elite culture, it becomes very hard to see Pompeii as purely the product of its hinterland, given that this hinterland was barely able to support the city with

grain in a scenario in which most inhabitants were living on or close to subsistence level. Clearly, the idea, once expressed by Jongman, that Pompeii was an isolated consumer city, is at odds with the town's material remains.⁵⁴ This, of course, comes as no surprise given the cosmopolitan character of the Bay of Naples from the late Republic onwards, and the fact that Jongman's minimalism had already been criticized by some of the reviewers of his book.⁵⁵ However, it is worth emphasizing that the argument here is not, as some reviewers have suggested, that Pompeii's agricultural territory naturally produced marketable surpluses *alongside* maintaining its population—rather that it did not: there must have been other sources of income or capital flows that supported Pompeii's consumer economy, otherwise the size of the town and the distribution of wealth apparent in the archaeological record cannot be explained. It could be argued that Nola and Nuceria had territories that were much larger than that of Pompeii, so that farms and villas on the land west of Nola and north of Nuceria could easily produce for the Pompeian market.⁵⁶ Yet this would not solve the problem—it would rather raise the question of where the Pompeians got the buying power to buy their food from farms that were better placed to serve Nuceria and Nola.

There is little place here for a detailed analysis of this issue, but, assuming that the idea that Pompeii made its money from exporting locally produced wool and textiles on a large scale is not sustainable, three possibly substantial sources of income spring to mind.⁵⁷ First, there is the well-known idea that Vesuvian region was a major exporter of wine, highlighted, once more, by Ferdinando De Simone in Chapter 1.⁵⁸ This idea was, of course, rebutted by Jongman, but his deconstruction has rightly been criticized, and has not made a lasting impact on the scholarly consensus.⁵⁹ Specializing in wine, and exporting it to other parts of the empire, may have yielded substantial profit that could have boosted the economy of the region's largest urban centre and most important harbour—Pompeii. Secondly, there is the role played by Pompeii—or rather, its harbour—in the trade flows to and from Nuceria

⁵⁴ Jongman (1988: esp. 97–203).

⁵⁵ See Banaji (1989: 230): 'The problem with the book lies in its minimalizing assumptions.' Cf. Purcell (1990: 112–15) on agriculture in Pompeii's territory. See also Frier (1991) and Scheidel (1992) on viticulture.

⁵⁶ The territory of Nola is delimited by Pompeii, Nuceria, Avella, Suessula, Acerra, Naples, and Herculaneum, resulting in a Thiessen polygon of c.200 km² excluding the mountains, but including the Valle di Lauro, which communicates with Nola rather than Avella. That of Nuceria is delimited by Pompeii, Nola, Avella, Abellinum, Salerno, and Stabiae, resulting in a Thiessen polygon of about 185 km², again excluding the mountain zones.

⁵⁷ On the Pompeian textile economy see Flohr (2013) and Monteix (2013). See also Chapter 7 (this volume: 219). On wine production see Chapter 1 (this volume: 35–40).

⁵⁸ Purcell (1985: 8); Tchernia (1986: 176–7).

⁵⁹ See esp. Scheidel (1992); Frier (1991: 244) notes that Jongman neglected Tchernia (1986). See also Andreau (1994).

and Nola, as referred to by Strabo, which may have attracted traders and businessmen—although Pompeii itself does not provide a lot of direct evidence for this.⁶⁰ Finally, and perhaps most importantly, there is the presence, in the region, and particularly along the coastline, of the Roman elite, many of whom owned land and property elsewhere in Italy and in the empire, while spending part of the income generated by these possessions in the direct environment of Pompeii, thus feeding the regional consumer economy. The fact that the first major ‘growth spurt’ of Pompeii in the late second century BC was roughly contemporary with the arrival of the first wave of senators and knights around the Bay of Naples suggests that Pompeii’s economy indeed directly profited from satisfying this group’s consumption needs.⁶¹ In reality, these three factors may have reinforced each other, and there may have been others that we can no longer trace, but the crucial point is that Pompeii, as it ended up, was dependent on them and would be a different, and much smaller, city had it been completely dependent on its own physical hinterland, instead of being embedded in regional and supra-regional trade networks and surrounded by the luxury villas of the Roman imperial elite.

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⁶⁰ Strabo 5.4.8. See Introduction (this volume: 5). On the potential impact of these ties on Pompeii’s textile economy see Flohr (2013).

⁶¹ On this period see esp. Pesando (2006). See also Introduction (this volume: 4).

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Part II

Quality of Life

Consumer Behaviour in Pompeii

Theory and Evidence

Nick M. Ray

Consumption is an often visible consequence of economic activity, particularly through consumer durables, which are one of the cornerstones of archaeology. The act of consumption is an integral part of all economies, present and past, and represents an important aspect of economic sociology and behavioural economics, reflecting the role of culture in everyday life. The economy of Pompeii, too, can hardly be understood without discussing consumption and consumer strategies, and exploring the possibilities of evidence for understanding aspects of such issues is a crucial part of this. The modern world is full of discussions about consumer behaviour, but we need to look at how it can be measured on the basis of evidence from the ancient world, and, more specifically, Pompeii. To modern studies of consumption, prices and income data are fundamental, as they permit statements about proportionate expenditure on goods, which in turn reflect levels of material priority and desire. However, for most of the ancient world, including Pompeii, this type of information is not available. Although we might be able to establish broad indications of purchasing power relating to stray coin finds or hoards of coins within houses, we unfortunately have little to go on in the way of price information that can be related to consumption patterns.¹ This means that direct examination of financial expenditure is currently limited. The question thus becomes one of how this subject can be broached through archaeological evidence. The present chapter will offer an answer to this by analysing consumer durables based within a socio-cultural context. The chapter will start by introducing the notion of consumption through highlighting some conceptual positions. This will be followed by two types of quantitative

¹ For example, see the evidence presented by Scheidel (n.d.).

analysis at the micro-level, using household data from Pompeii. First, vessel data will be examined using standard quantitative analyses; subsequently, archaeological data will be superimposed upon the frame of discretionary expenditure to suggest a method of modelling consumer behaviour using multivariate statistics.

THEORIZING CONSUMPTION

There is, unfortunately, a general lack of economic models and theory for the modern world that take consumption into account, especially in terms of what the consumed means to the consumer. The integration of material and cultural factors is relatively ignored, despite the fact that objects and human perceptions of them are inextricably linked to one another.² This is where the stumbling block for relating postmodern consumer theory to economies is encountered. The approach taken by mainstream economics has been to simply apply the abstract concept of utility maximization (subject to a prevailing budget and price constraints), neglecting issues such as use-value and fetishism.³ This in turn feeds into, and perpetuates, the oversimplistic production–consumption dichotomy via supply and demand. For example, one method is to base analysis on the theory of intertemporal choice, whereby an individual's behaviour is based on a choice between present or future consumption, in a world of complete certainty. For this, consumer tastes and preferences are represented by a utility function, in which it is assumed that the consumer maximizes satisfaction based on the availability of goods and their budget constraints.⁴ For the ancient world we cannot easily talk in terms of simplified consumer budget sets that are based on prices, income, and interest rates, let alone discuss Engel curves—which are used to show the path of consumption as income changes, if prices are kept constant.

Challenges to the principle of utility maximization are not a new phenomenon, as the concept had already been rejected by Veblen in the late nineteenth century in his argument for more complex economic models of taste and consumption—for example, in his work on the theory of the leisure class and conspicuous consumption.⁵ An alternative economic theory of consumption is the income hypothesis, which argues that consumption preferences are 'dependent upon economic stratification and paths of social mobility'.⁶ Such an approach, however, is unable to get away from the need for price information and consumer wealth profiles, while still maintaining a hold on the notion of utility maximization. This is highlighted by the recent treatment of

² Fine (2002: 5).

⁴ Deaton (1992: 2).

³ Krugman and Wells (2012: 281ff.); Hunt (2002: 376).

⁵ Veblen (1994 [1899]).

⁶ Fine (2002: 130).

consumption by the European Commission (EC), from which three things are evident. First, there is a movement at least attempt to acknowledge the multiple facets of the motivation behind consumption, with the statistical office for the European Union (EU) stating that patterns of household consumption expenditure 'vary widely among EU Member States, due to cultural, economic and some other factors affecting spending and saving habits'.⁷ These 'other' factors include weather, household composition, and degree of urbanization. Secondly, consumption behaviour offers proxy evidence for economic growth or decline, with the economic crisis of 2008 providing a prominent example of this through many regions experiencing a decrease in the consumption of durable goods.⁸ Thirdly, quantitative analysis comes down to household expenditure based on an index of consumer prices (with no uniform consumption basket), which perpetuates utility functions. Ultimately, however, this methodology requires the application of gross domestic product (GDP) figures in relation to private consumption, which creates even more problems for the Roman world; Bowman and Wilson have recently expressed doubt over estimates for per-capita GDP for antiquity because of uncertainties about population figures.⁹ Therefore, to attempt a further level of quantification beyond population and GDP is to work from precarious foundations.

The fact there is no standardized consumption basket for the EC analysis indicates some of the methodological problems related to studying consumer behaviour in quantitative terms. For the ancient world, these problems are compounded further by the lack of detailed economic information; the closest we have been able to get to this kind of consumption model is through considering consumption baskets of subsistence goods or by using stature as a proxy for standards of living.¹⁰ Allen provides a valuable discussion of the subject by using Diocletian's Price Edict to calculate the cost of supporting a family over the course of a year, referring to specified goods (such as beans, meat, eggs, oil, and fuel).¹¹ The ability to acquire this consumption basket was then assessed in relation to a labourer's wages and compared to several eighteenth-century European cities. This method avoids the need for GDP estimates, but it cannot be applied to the examination of household consumption in Pompeii. For this we need to turn to examining social contexts of consumer behaviour, which in itself is an area of study that has previously received relatively little attention, even for the modern world.¹²

Exploring social contexts means considering why similar behaviour might be observed between households (or not), and looking for reasons as to why preferences emerge between types of goods. Also, there is a need to investigate why people value certain objects beyond their monetary value and, related

⁷ Gerstberger and Yaneva (2013a).

⁸ Gerstberger and Yaneva (2013b).

⁹ Bowman and Wilson (2009b: 12).

¹⁰ E.g. Jongman (2007); Von Reden (2007).

¹¹ Allen (2009); see also Scheidel (2010).

¹² Fine (2002).

to the above discussion, think about how concepts such as conspicuous consumption can be explained through the concept of optimum utility. Fine argues that we should start to try to identify why similar consumption patterns might be observed across different strata of people.¹³ One method of addressing this has been through Bourdieu's work, in which he has argued that 'taste' is a status-marking force that causes consumption preferences to cluster together: a lifestyle (a system of tastes) is indicated when many people consume the same items.¹⁴ Within this perspective, capital can be divided into economic, social, and cultural elements, all of which influence consumptive behaviour.

Integral to many of these ideas is the notion of 'reference groups', which refers to an individual, or collection of people, whom the consumer uses as a source of behaviour, values, or beliefs. Therefore, this source forms a frame of reference for a person's actions, and may represent a group to which the individual belongs, or one they aspire to join, although complete conformity is rare.¹⁵ Conversely, negative reference groups can exist, inasmuch as the actions or behaviour of an individual, or collection of people, are repugnant to a consumer, causing dissuasion from or active evasion of such actions.

One classic study of social differences in taste and choice involved researchers cataloguing homeowners' possessions while sitting in their living rooms and asking them about their income and occupation. The results, when quantitatively analysed, suggest clusters of furnishings and decorative items; different clusters were found depending on the consumer's social status. For example, researchers tended to find a cluster consisting of religious objects, artificial flowers, and still-life portraits in relatively lower-status living rooms, whereas they were likely to catalogue a cluster of abstract paintings, sculptures, and modern furniture in a higher-status home.¹⁶

In an attempt to reach a viable medium between the rationality of formal economics and the 'procedural rationality' of psychology, the concepts of bounded rationality and satisficing have been used to introduce cognitive limitations and reflect social and environmental factors within decision-making processes.¹⁷ To 'satisfice' means not to choose an optimal outcome or select an item that is classed as unique or the best; an alternative is evaluated and selected when it attains or exceeds specified criteria.¹⁸ This term is, therefore, intertwined with the concept of rationality, but not in terms of a formal economic theory that assumes optimization or utility maximization subject to budget constraints.¹⁹

¹³ Fine (2002: 152). ¹⁴ Bourdieu (1984: 171).

¹⁵ Foxall, Goldsmith, and Brown (1998: 214–17).

¹⁶ Laumann and House (1970); Bell, Holbrook, and Solomon (1991).

¹⁷ For example: Simon (1982: 259–68, 444–59; 1997).

¹⁸ Simon (1997: 295); Schwartz et al. (2002: 1178) refer to this as the 'acceptability threshold'.

¹⁹ Simon (1997: 295).

In the present context, the question is whether we can use some of these concepts to examine archaeological data in terms of behavioural economics at Pompeii. Before entering into a case study, however, it is necessary to clarify two important points relating to limits of the study and the application of terminology. First, in order to escape modern capitalist connotations of the concept of consumption, the following discussion follows the broad definition of consumer behaviour given by Schiffman and Kanuk:

[T]he behaviour that consumers display in searching for, using, evaluating, and disposing of products, services, [practices,] and ideas which they expect will satisfy their needs.²⁰

As such, it can be seen that the act of consumption is not solely a process representing the utilitarian, material object; it also encompasses cultural signs and symbols. For the purposes of this study, the investigation of consumption in Pompeii will be limited to durable goods and objects, although there is the potential to expand this to incorporate other areas included in Schiffman and Kanuk's definition.

A second topic that needs brief attention is the notion of 'consumerism'. This term is often referred to as describing 'a society in which many people formulate their goals in life partly through acquiring goods that they clearly do not need for subsistence or for traditional display'.²¹ Trentmann argues that consumerism carries slippery, morally charged connotations, and is not always a historically helpful term of analysis because it does not express behavioural realities.²² Consumerism is also frequently discussed and approached as a mentality.²³ Gerth takes a similar standpoint, arguing that although *consumption* is a term that can be applied throughout history, *consumerism* is a concept loaded with branding and mass production and is a recent phenomenon.²⁴ Recently, Greene examined several studies of applied art, bead necklaces, pottery, and lamps from the Roman Empire, and argued that some forms of Roman consumption can fall under this label.²⁵ Greene highlights the importance of the communication of knowledge, especially with regard to technical innovation, and suggests that a sufficient rapidity of change in fashions and tastes is indicative of consumerism. So, in some regard, there is space for a dialogue about aspects of consumerism in the Roman world, but it needs to be one that is carefully considered. Consequently, this concept will be avoided in the following discussion, with the focus resting on the less anachronistic term of consumption.

²⁰ Schiffman and Kanuk (1987: 6). ²¹ Stearns (2001: ix); see also Stearns (2009).

²² Trentmann (2009: 189). ²³ Trentmann (2004).

²⁴ Gerth (2012: 418). ²⁵ Greene (2008).

POPULATING THE THEORY

The data that will be used in this study are from artefact assemblages recovered from atrium houses in Pompeii, collated by Penelope Allison and used in her studies of artefact distribution.²⁶ Due to concerns of data integrity based upon excavation date, a core judgement sample of twelve houses has been used (Table 3.1). All are clustered in a single district in the southern area of the city: eleven are from the northern part of Regio I (in insulae 6, 7, 10, and 11), while the remaining house is located in insula IX 13. This region was excavated in a period during which comparable standards of excavation and recording finds were used. Having a geographically restricted data population acts as a reducing factor for error introduction or data variability due to urban location and spatial differentiation via different geographies of consumption. This is even more important when considered in relation to Miko Flohr's argument that land prices could be dependent on location within the city.²⁷

The collections of goods within the households can be used to address questions of acquisition, consumption, and consumer behaviour. Furthermore, the household assemblages come from occupation generally limited to the pre-eruption phase, although this does not represent a static period of time. Chronology was a much more sensitive factor for Allison in her studies of artefact distribution and room use because of contemporaneity of use or

Table 3.1 Houses in the data population

No.	House	Size of vessel assemblage		AD 79 occupation (after Allison, 2004a)
		ceramic	other*	
1	House I 6, 8–9	63	2	Largely unoccupied
2	Casa dei Quadretti Teatrali (I 6, 11)	40	45	Partially occupied
3	Casa di Stallius Eros (I 6, 13)	5	8	Unoccupied
4	Casa del Sacerdos Amandus (I 7, 7)	32	9	Unoccupied
5	Casa dell'Efebo (I 7, 10–12)	91	57	Largely unoccupied
6	House I 7, 19	21	4	Partially occupied
7	Casa del Menandro (I 10, 4)	212	248	Occupied
8	Casa del Fabbro (I 10, 7)	90	110	Occupied
9	House I 10, 8	54	6	Occupied
10	Casa degli Amanti (I 10, 11)	33	18	Partially occupied
11	Casa della Venere in Bikini (I 11, 6)	14	42	Occupied
12	Casa di Julius Polybius (IX 13, 1–3)	327	203	Occupied

* Glass, bronze, silver.

²⁶ Allison (2004a; 2004b); see also Allison (2006).

²⁷ See Chapter 2 (this volume).

changing spatial function over time.²⁸ The level of occupation at the time of the eruption in AD 79, however, remains an important consideration in this study.

As Allison has previously stated, depositional circumstances and the processes of abandonment are important considerations for archaeological data.²⁹ For Pompeii, these include removal of objects prior to the interment of the city, and post-depositional processes such as ancient, and more historically recent, looting of objects.³⁰ The problem of the recovery and salvage of objects after the eruption is another factor to add to this list.³¹ Incomplete recording of material at the time of recovery and excavation also creates its own problems. This is a factor especially notable for more mundane items and is not unique to Pompeian archaeology; Weatherill discusses the problems associated with different levels of detail in recording for lesser-value items in British probate inventories of the seventeenth and eighteenth centuries.³²

Past studies that have examined historical ceramic consumption behaviour have emphasized the level of the household as an appropriate scale for analysis.³³ Although this level of resolution is not always feasible for the Roman period it is the highest resolution that we can hope to meaningfully and quantitatively achieve at Pompeii.³⁴ The ownership of objects at an individual level is especially difficult to identify, and within these Pompeian houses there would have been a range of social standing present in various forms: from the 'owners' at the top of the hierarchy to the slaves at the bottom. Separating who owned what is an unattainable target and therefore individual status levels are not possible to identify with a high degree of confidence. Moreover, this impacts on issues of cultural value, as occupants of the house will have ascribed values differently. Recent work on the identification of slaves through material culture has indicated the potential for this avenue of investigation, which could be of value in the future for consumption studies, but is not possible with the current data.³⁵

The following analysis will examine data from Pompeii at the level of the household for the properties listed in Table 3.1. This will start with an overview of patterns in ceramic vessel assemblages, addressing some broad questions about consumption choices. The focus will then move onto a more integrated approach that considers all vessels in the households within the frame of discretionary expenditure. Subsequently, the discussion will consider the data analysis within the context of the social economy.

²⁸ Allison (2006: 14–15); for example situations, see Allison (2004a: 78–82).

²⁹ Allison (1999b: 6); see also McKee (1999).

³⁰ Allison (2004a: 21–4; 2006: 12–15). ³¹ Berry (2007).

³² Weatherill (1996). ³³ Deetz (1982); Gibb (1996); Henry (1991); Klein (1991).

³⁴ For example, see Fincham (2002). ³⁵ See e.g. George (2011).

ASSEMBLAGES OF VESSELS

When the number of ceramic vessels for the houses in the sample are considered, it is apparent that, aside from two very large assemblages for the Casa del Menandro (I 10, 4) and the Casa di Julius Polybius, the numerical variation is not as substantial as might be expected; the remaining ten houses all have a ceramic count of less than one hundred artefacts. Assumptions about the influence of house size require caution because, surprisingly, this variable proves not to be a statistically significant factor for determining numbers of ceramic vessels present, suggesting that smaller houses also had the means to consume in quantity.³⁶ From the perspective of depositional processes, it is worth noting that the state of occupation at the time of the eruption does not appear to be a significant factor, particularly evident by the small number of vessels present in the Casa della Venere in Bikini (house 11). However, looking at the number of vessels alone is a small part of the story: other factors need to be considered as well.

The next step is to compare the overall number of ceramic vessels in a house to the occurrence of different vessel types. This makes it possible to consider the variation within the assemblages. In doing this, it becomes evident that as the assemblage size increases so does the range of vessels—this is a statistically significant trend. An index of variation can subsequently be produced, permitting comparison across the data population, where variation is simply calculated by the number of ceramic vessels divided by the number of vessel types that are present. Plotting this index against house size demonstrates that, once again, the variability within assemblages is not significantly determined by house size (Figure 3.1). Therefore, we can start to assume that there are other more important determinants for patterns in the acquisition and possession of vessels.

When considered at the individual household level, there are notable differences between the ceramic assemblages, although there is not a bundle of ceramic goods that could be considered to represent a ‘standard’ assemblage. Similarly, as previously noted by Allison, there are no ‘sets’ of vessels present in the houses.³⁷ The overall trends for ceramic vessels can be generalized in the following four points: (i) more ceramic vessels mean more ceramic variation, but this trend is not determined by house size; (ii) there is a wide range of vessel forms evident in the data population, with a heavy presence of storage vessels (such as amphorae and jars); (iii) serving vessels are not as predominant as might be expected; and (iv) cooking vessels are a rarity. If ceramic lamps are included in this class of consumer durables, they also

³⁶ The level of confidence for statistical significance has been measured at the $p = 0.05$ level, unless otherwise stated.

³⁷ Allison (2004a).

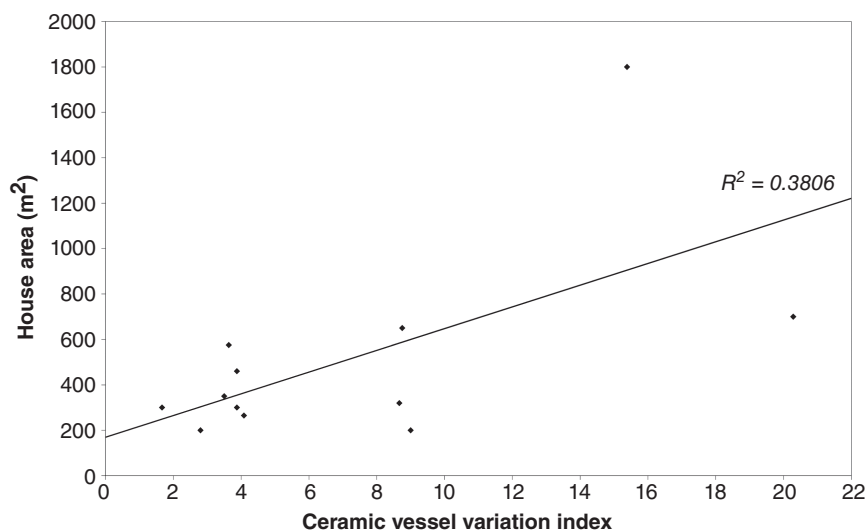


Figure 3.1 Variation in ceramic vessel types relating to house size. Illustration: Nick Ray.

represent a core good. In fact, if the types of ceramic vessels are weighted by occurrence across the data population and then ranked by prevalence, lamps are placed third, after amphorae (first) and jars (second).

Examination of ceramics by themselves, however, forms only part of the vessel assemblage; it is also necessary to examine vessels of other materials, especially glass and metal. At a basic level, when the occurrence of ceramic vessels and vessels of other material are compared, a statistically significant correlation is evident (at the $p = 0.01$ level). However, the picture is much more complex than this as there are other variables to consider, particularly the different material types that comprise the other vessels category. When the constituent parts (glass, bronze, and silver) are examined as separate groups, the overall other vessels to ceramic vessels correlation is reflected by glass vessels, which exhibit a strong adherence to the trend line with little in the way of deviation.³⁸ Silver vessels also demonstrate this correlation, although the results should be approached hesitantly because the majority of the data (91.7 per cent) came from the Casa del Menandro (house 7); this is supported by the fact that the silver:ceramic vessels correlation is not statistically significant. Figure 3.2 depicts the relationship when the silver vessels from the Casa del Menandro are omitted from the analysis, demonstrating this spurious correlation.³⁹ Bronze vessels exhibit a very weak positive

³⁸ Significant at the $p = 0.01$ level.

³⁹ The exceptional presence of silver within Casa del Menandro is visible in Figure 3.3.

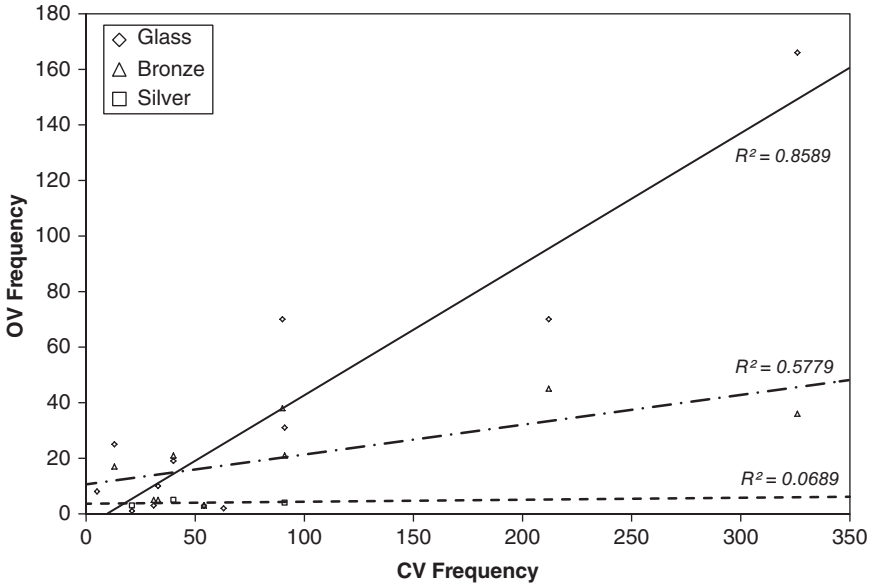


Figure 3.2 Occurrence of OV by material in relation to CV, with silver data from Casa del Menandro omitted. Illustration: Nick Ray.

correlation with ceramic vessels, indicating that an increase in the consumption of the latter does not necessarily result in an increased consumption of the former (the correlation is not statistically significant). This could potentially be due to economic reasons, such as cost, availability, or both, but it could also reflect preferences: once the acquisition of the more ‘essential’ bronze vessels (such as cookware) had been achieved, a consumptive ‘threshold’ was reached, beyond which few households ventured. In other words, there appears to be a lower elasticity of demand for functional cooking vessels. Such a threshold is reflected in Figure 3.3 through the relatively consistent proportional occurrence of bronze vessels.

Glass and Bronze

When the glass vessels are ranked by artefact type (weighted by occurrence across the data population) the emphasis is on storage containers, with bottles, jars, and vases forming the majority of this class of object. In fact, they are near-ubiquitous vessel forms, and therefore represent core goods. Serving vessels (such as cups and bowls) are relatively infrequently encountered, and there is a very low representation of large dishes and plates.

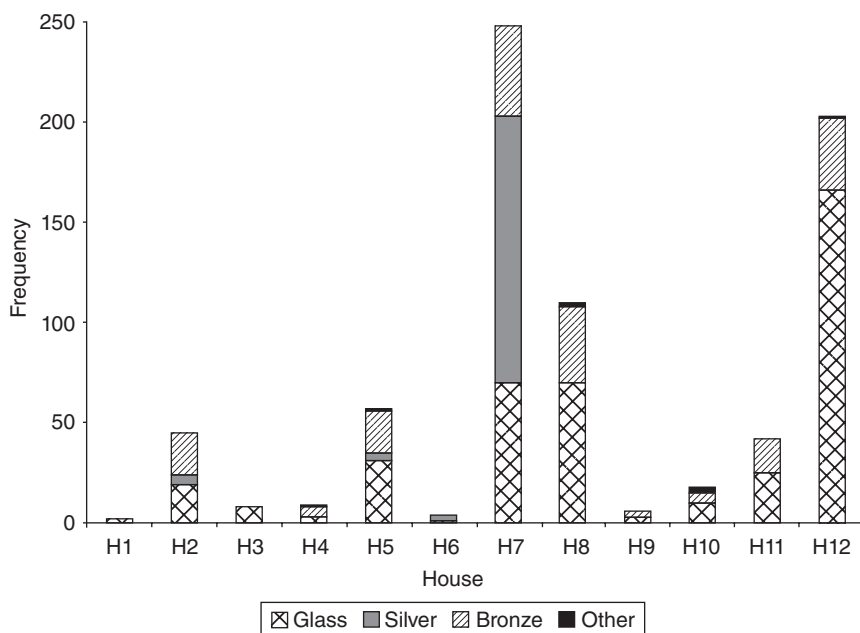


Figure 3.3 Other vessel occurrence in assemblages by material. Illustration: Nick Ray.

It is relevant to compare these observations with two statements concerning Roman glass consumption made by Stern.⁴⁰ The first is that glass was the preferred material for storage containers by the mid-first century AD—a conclusion reinforced by the Pompeian data. However, Stern also states that glass jugs and decanters were a great Roman tradition, one that began before the middle of the first century. This is not evident within the household assemblages examined here. In fact, there are only four occurrences of glass jugs, whereas there are forty-six ceramic and fifty-seven bronze examples (Figure 3.4). Assuming that such vessels were used for the service of wine, one of the key advantages of glass—that it did not affect the taste of wine—did not seem to be a primary consideration for these Pompeian households.⁴¹

Bronze vessels are an interesting category as they often appear to fill gaps in the vessel assemblages, such as the jugs just discussed. The case is similar when it comes to cooking vessels: ceramic examples are relatively rare, with only four examples in the data sample (11 per cent), but bronze vessels have a large representation (89 per cent), filling a gap in the overall character of the household assemblages. Depending on availability, accessibility, freedom of

⁴⁰ Stern (1999: 479).

⁴¹ Stern (1999: 479).

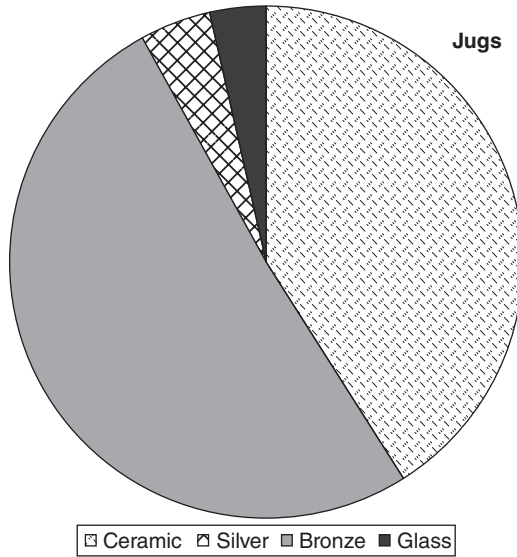


Figure 3.4 Jugs by material. Illustration: Nick Ray.

choice, and economic constraints (whether financial or regarding exchange of goods), the act of satisficing becomes meaningful here. The strong presence of bronze cooking vessels could be related to consumer choice based on an acceptability threshold of requirements. For example, if a ceramic cooking pot breaks and a replacement is required, the individual tasked with acquiring a substitute vessel is faced with a choice between an exact replacement and an equivalent alternative. What if there is no exact replacement available? Would a more robust, durable alternative, such as a bronze vessel, be more desirable than a brittle ceramic pot? Or perhaps the decision was based on other functional concerns, such as the more efficient thermal properties of the bronze vessels. A decision of this nature would suggest cognitive reasoning in terms of weighing-up economic outlay in relation to duration or efficiency of functional return. We will never be able to identify the specifics of the reasoning behind the selection of particular goods, but the evidence suggests that these Pompeian households did have options available to them, enabling them to set a perceived acceptability threshold.

MULTIVARIATE ANALYSIS

The next step is to subject the evidence to correspondence analysis. This is a multivariate statistical technique for creating visual displays of cross-tabulated

frequency data in the form of a biplot. The value in this technique is that it displays systems of associations between variables, which, in this study, are those of artefact categories and household assemblages.

The output of the analysis permits a graphical comparison of category associations (or 'correspondences') thus indicating which rows or columns of the table are similar, or different. The technique can be thought of as a spatial map of the data.⁴² The distances between category points in a biplot reflect the relationships between the categories and variables, with those having close associations being plotted close to one another. The average (or 'most typical') assemblages or artefact types are located closest to the centroid.⁴³ The numerical conditions of the scale are not important for our purpose; rather it is the corresponding positions of the data points that are of interest. Although similar assemblages are located close to one another in a plot, and assemblages with similar compositions are found to cluster near to each other, it is essential to recognize that it is only possible to spatially relate variables of the same kind: direct comparison can only be made in terms of row to row and column to column; that is, assemblage to assemblage, artefact type to artefact type. Comparison of the two types of variables (artefact types to assemblages), can only be carried out in relative terms, and not as absolute spatial distinctions.

Using this statistical technique means that it is possible to identify consumption orientations through predominant assemblage characteristics. Such a process can serve to verify and add resolution to results from basic quantitative analyses. When the data relating to all vessels are plotted using correspondence analysis, it is possible to develop greater definition in the patterning of consumer preference and orientation.

Figure 3.5 displays the data according to vessel form; for the sake of clarity, only the houses that have been interpreted as occupied at the time of the eruption have been included. The *y*-axis seems to represent a scale of vessel material, with the upper part of the biplot indicating a ceramic-oriented vessel consumption profile, whereas the lower part indicates a bronze-oriented consumption profile. Glass represents a class of vessel that overlaps the ceramic-bronze divide, while silver vessels are outliers (reflective of the silver hoard in the Casa del Menandro). The lack of a house data point at or close to the centroid emphasizes the fact that there was not a 'standard' consumption practice with regard to vessels. Incidentally, when all twelve houses are included in the analysis, the patterns are more opaque but nevertheless still present.

This overall pattern could be reflective of household consumption preference, and potentially expenditure, in terms of vessels. This is not to suggest a simple

⁴² Greenacre (2007).

⁴³ Pitts (2008: 497).

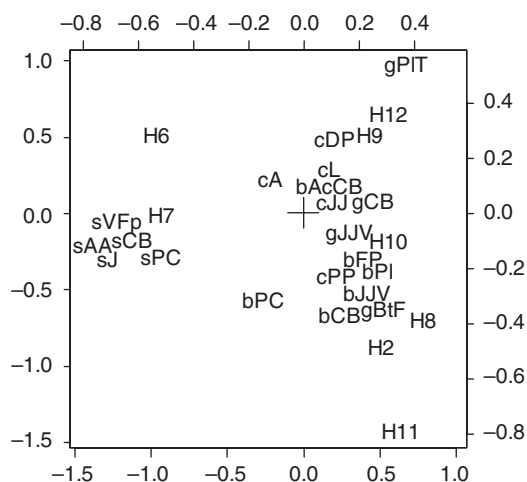


Figure 3.5 Correspondence analysis biplot of vessel form for 'occupied houses'. Illustration: Nick Ray.

high–low dichotomy but two predominant bands of consumer preference, with glass offering a mid-range alternative. As all of these houses would have had access to the same range of goods within the same area of the city, such patterns are likely to reflect systems of tastes rather than market availability of products.

DISCRETIONARY EXPENDITURE AS A CONSUMPTION MODEL

The next stage in assessing patterns of consumption and systems of taste is to examine the overall artefact assemblages and frame them within the concept of discretionary expenditure to model consumer behaviour. As we have just seen with the vessel analysis, in addition to economic and utilitarian factors, the act of consumption relates to a person's expectations. Such behaviour therefore encompasses the constructs of rationality as well as consumer perception and information processing. One of the underlying themes in the evaluation of consumer behaviour is the concept of 'needs' versus 'wants'. This has taken many forms in the evolution of its discourse, most commonly through the needs–wants division, otherwise stated as necessities–luxuries. This strict division is oversimplified, however, as the concept of luxury—'items of

desire’—is situational and relatively individual. Different people have different concepts of what is needed and what is desired, or preferred.⁴⁴

‘Non-urgent’ or ‘created’ wants are seen to be stimulated by the process of emulation described by Veblen, and correlate with the assertion that ‘our desires are not simply person-thing relationships; they inevitably involved other people’.⁴⁵ This creates an ‘aggregate perception’ of a consumption object constructed by the individual through two dimensions: (i) an interpretation of the object’s attributes (*attribute dimension*); and (ii) its action potential (*performance dimension*).⁴⁶

Discretionary expenditure incorporates numerous relevant theoretical concepts (such as consumer perception, attribute information processing, and satisficing), to facilitate a pathway for modelling consumer behaviour. Furthermore, it is an alternative way to create a dialogue of desire because it represents the process of the purchase (acquisition) of ‘wants’ rather than ‘needs’. This construct represents a method of exploring resource allocation beyond financial spending alone. In essence, this is a way in which to investigate trade-off expenditure based upon value prioritization.

Danziger divides acquisitions into four main types, placing them into a matrix of discretionary spending that reflects goods according to their physical/material or emotional qualities on one axis, and their extravagant and practical/necessity qualities on the other.⁴⁷ These are represented in Figure 3.6 with definitions and examples of objects from the Pompeian assemblages. For example, discretionary expenditure on ‘Utilitarian’ goods represents items that are perceived as making life better in a way that is measurable, such as a microwave or blender in the modern home. This represents something that is physical and practical, such as bronze cookware or bronze lampstands in the Pompeian household. This is an important component for studies of the ancient world because it is an intermediate stage between ‘necessity’ and ‘luxury’ but maintains a connection with mundane consumption of durables. A prominent consideration for the application of the concept of discretionary expenditure to ancient material consumption is that the matrix is relevant for all social levels, income brackets, and life stages.⁴⁸ Therefore, this negates the need to incorporate information regarding profession or occupation, and thus wealth profiles and ‘wage’ levels.

When the classifications represented in Figure 3.6 are applied to the Pompeian household data and subjected to correspondence analysis, some

⁴⁴ See Belk, Ger, and Askegaard (1997: 24); Berry (1994); Bloch and Richins (1983); Bourdieu (1984).

⁴⁵ Veblen (1994 [1899]); also see Campbell (1995; 1998); Galbraith (1987). For the quote see Belk, Ger, and Askegaard (1997: 26).

⁴⁶ Kleine and Kernan (1991: 312).

⁴⁷ Danziger (2004: 24ff.). ⁴⁸ Danziger (2004: 25–6).

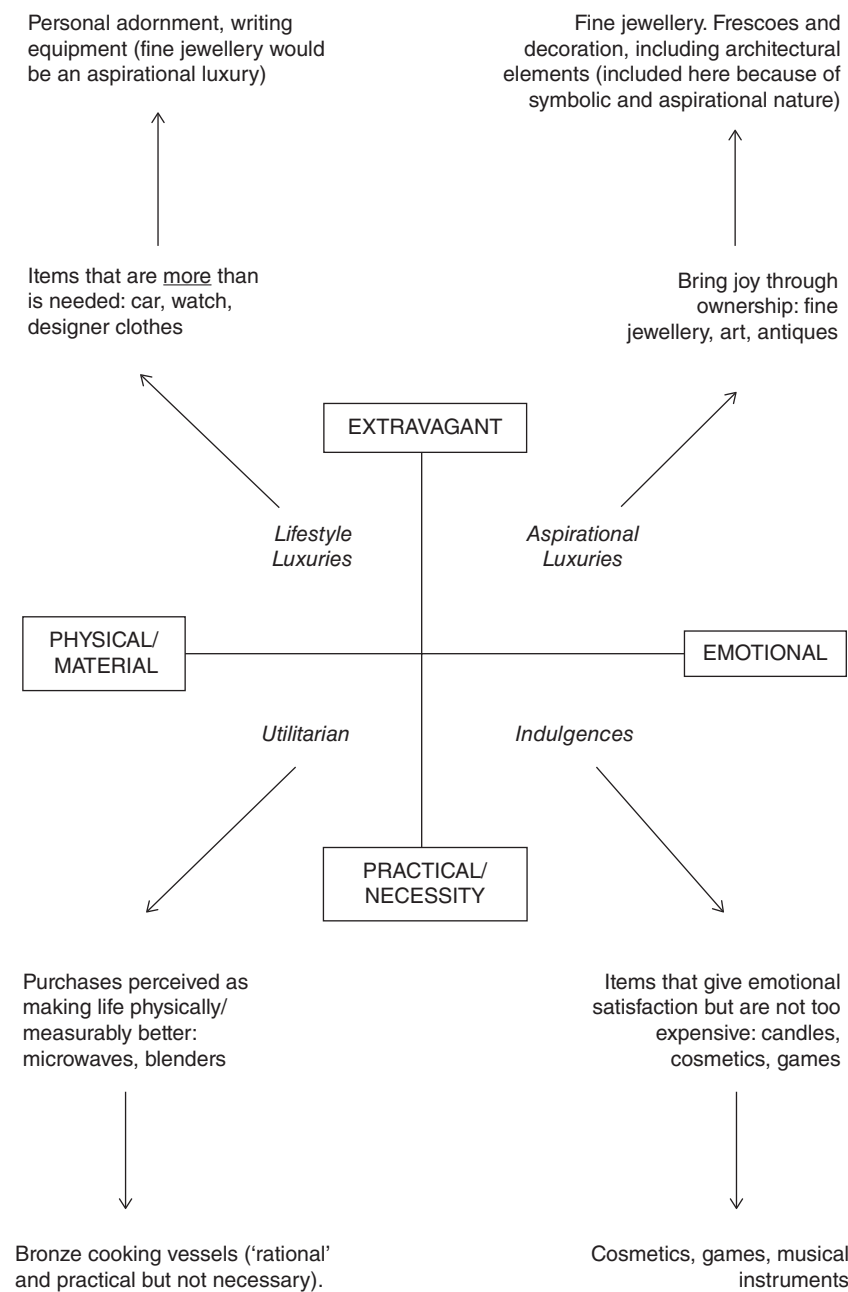


Figure 3.6 Discretionary products matrix. After Danziger (2004: 25), with additions.

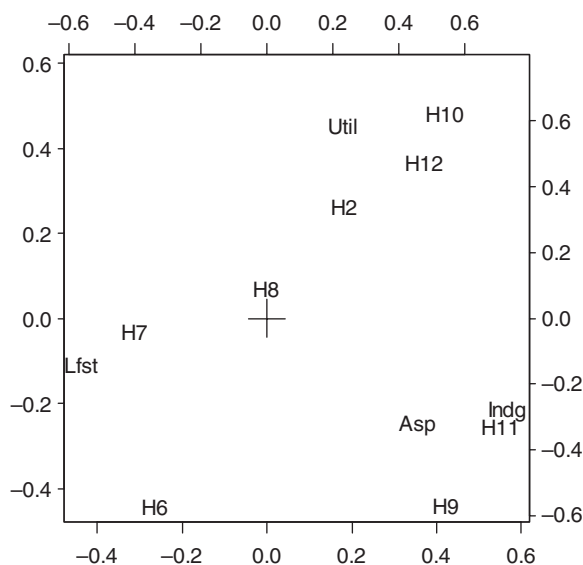


Figure 3.7 Assembled household items by discretionary expenditure (Indg—Indulgences; Util—Utilitarian goods; Lfst—Lifestyle luxuries; Asp—Aspirational luxuries). Illustration: Nick Ray.

clear trends become evident (Figure 3.7). For instance, houses 2, 10, and 12 (upper right quadrant; Casa dei Quadretti Teatrali, Casa degli Amanti, and Casa di Julius Polybius, respectively) exhibit a relatively strong correspondence with Utilitarian (Util) objects. The presence of house 12 in this area of the biplot can probably be explained by the very large ceramic assemblage, which primarily must be seen as the result of more thorough excavation strategies.

Houses 6 (House I 7, 19) and 7 (Casa del Menandro) show an association with 'Lifestyle' goods (Lfst), with the former being located at the base of the biplot, indicating that its consumption orientation is one of the most distant from Utilitarian (in the lower left quadrant with Lifestyle goods). We can therefore consider the y -axis to reflect the utility–emotion scale of consumer durables. House 8 (Casa del Fabbro) is located at the centroid and reflects an orientation that is the most 'average' in the dataset when considered in categories of discretionary expenditure. It is, perhaps, possible to stretch this interpretation to a situation where households obtain a base constellation of goods that fulfil the utilitarian needs of the occupants; once this is achieved there is a system of tastes involved that are reflected either as lifestyle choices or reflections of indulgences and aspirations. Under these terms, the context of the house could be important because the two houses most closely corresponding to Aspirational luxuries (luxuries closely corresponding to emotional

satisfaction while also displaying extravagance (Figure 3.6), are the smallest houses in terms of area, while the house closest to Lifestyle luxuries is the largest.

DISCUSSION

The first part of this chapter demonstrated that larger vessel assemblages were associated with greater variation in terms of representation of different artefact types. This indicates that when households consumed quantitatively 'more' they also broadened their consumption repertoire. Moreover, it is apparent that consideration of ceramic vessels in isolation, although valuable, does not provide the full picture for vessel consumption in Pompeian houses. To build a detailed profile of consumer orientations it is necessary to consider not just different vessel forms and artefact types, but also alternative constituent materials. Such a pattern reflects the fact that a wide range of commodities were available to Pompeians, although whether they had the means and capital to acquire them is a different matter. Furthermore, it presents a picture of a productive market element within the urban landscape, whether relating to the finishing of goods (signifying a local or regional importation market) or to multiple stages of production.

Significantly, this study demonstrates that the picture of consumption in a series of houses from a relatively high socio-economic level is neither simple nor standardized, revealing unexpected complexity in the material record of Pompeian houses. The explanation of the variation does seem in part to be due to differing consumption strategies and extensive choices available to households. For example, the glass and metal vessels in this data population suggest an availability of non-ceramic consumer durables that were present in both large numbers and product variability. Additionally, as fragile glass vessels appear to represent a wide-ranging substitute option for ceramics, the discussion swings back to the subject of consumerism: does this high occurrence of glass indicate a disposable mentality of consumers born out of low financial outlay and ease of replacement? If so, this behaviour veers towards consumerism because there are moral components involved, such as waste, and implications for widespread availability of goods, linking back to levels of production.

We need to remember, however, that this is the tip of the iceberg: the objects in the household assemblages are those that have entered and been preserved in the archaeological record. There are many non-durable consumer goods that would have been present in these households: clothing and textiles, furniture and furnishings, food and drink, materials for heating, and even slaves. There also would have been the consumption of entertainment in its various guises

and of education, such as through tutors or reading and writing materials (of which there is little physical evidence in the current dataset). The fact that we are able to talk about commodity choices and reflect upon consumer constellations and strategies demonstrates the strength of economic interactions in Pompeii and the surrounding region, extending consumption behaviour beyond a limited repertoire of utilitarian goods.

This implies a vast consumer landscape that could have been entered into at many different levels by many different social classes. At the same time, however, it should not be forgotten that parts of Pompeian households—and the wider population—would have been at the lowermost levels, living at or close to subsistence. Although the data in the study presented here are from houses at the wealthiest end of the spectrum, there would have been a considerable aggregate purchasing power within the population as a whole. For example, in a much-needed assessment of production capacities offered by pottery workshops in Pompeii in relation to aggregate supply demands, Peña and McCallum produced an approximation for the total city-wide consumption of ceramic goods.⁴⁹ They suggested that there would have been ‘tens of thousands of non-amphora vessels acquired each year [equating to] at least a few score vessels each day’.⁵⁰ When the scale of this is considered in terms of the consumption of the many other different types of goods available to individuals or households, the magnitude is enormous.

Linking into this is the concept of consumer trust with regard to production and retail services.⁵¹ Repeat purchases and the subsequent development of a bond of trust can be important; in the modern world this also includes reliance and acceptance of ‘brand name’. In the Roman world, consumer–merchant trust relationships could have been reinforced through repeat purchases based on product confidence. Within this frame, it is possible to imagine consumers reducing time expenditure searching for consumer durables, grounded upon a combination of geographies of exchange (such as retail or productive units) and trust relationships based on experiential consumption practices. This becomes even more applicable when we consider the scenario of wealthy patrons inviting merchants into their homes to display their wares, or commissioning craftsmen to make products, such as jewellery, to order.⁵² If many traders are offering similar goods, or similar goods with different qualities, a recognition mechanism is triggered, serving as label-branding or quality assurance. A trader who could be trusted to produce consistent-quality goods was likely to have garnered repeat customers, helping ensure economic longevity.

⁴⁹ Peña and McCallum (2009a; 2009b).

⁵⁰ Peña and McCallum (2009b: 181).

⁵¹ This is not to argue that Pompeii should be labelled a ‘consumer city’; the argument here is one of consumer activity within an economy. Similar processes of consumer behaviour have been suggested for ship cargoes dating to the sixth century BC: Greene, Lawall, and Polzer (2008).

⁵² Holleran (2012: 244–5).

Economic survival is possible without repeat customers for products, but, in a competitive urban centre where choice is widespread, economic growth has greater potential with a healthy consumer base.

While the focus of this study has been predominantly on Pompeii, it is relevant to consider how typical Pompeii is as an example of urban consumption in the Roman world. This is not a question that is easily answered. However, even if Pompeii was a special case within the empire at this time, the sheer demand for goods and services by the consuming population cannot be ignored. It is possible that, through Pompeii's location in the Mediterranean and relative proximity to Rome and other urban areas in the Bay of Naples (especially ports such as Puteoli), the city did welcome an exaggerated wealth of merchandise, supplying the human desires for material culture and the financial ability to obtain it. Perhaps this is not 'typical' for most Roman cities but it is reflective of the potential for urban consumption capabilities. It could be argued that Pompeii was not remarkably rich and atypical because, if it was, it might have been closer to the ideological limitations of the sumptuary laws. For example, the silver plate from the Casa del Menandro has an aggregate weight of 23.5 kg, equating to seventy-two Roman pounds, but only represents a fraction of the sumptuary limitations of which we know.⁵³ There are several problems with taking sumptuary laws literally, but the point here is that the evidence for private wealth from the Pompeian households is well within the limits of these regulations. However, the silver plate from the Casa del Menandro is still a considerable outlay of capital as it represents a purchasing power of the order of approximately 310 years' wheat equivalent, or nearly 430 times the value of the coinage found in the house.⁵⁴

It has been asserted that a lack of usable models is a factor that impedes investigations of household consumption.⁵⁵ The study presented here provides such a model by using quantitative analysis to investigate consumer behaviour within an archaeological context. It is, however, important to acknowledge that statistical analysis of this kind cannot provide all the answers, especially when it comes to exploring personal involvement relating to consumer choice. Nevertheless, it broadens our understanding of consumer behaviour and decision-making considerably in an analytical way previously not possible. As Harris rightly stated, the study of consumption has a great deal to tell us about the Roman economy.⁵⁶ There are still plenty of avenues that need to be explored, especially in terms of consumption patterns at lower socio-economic levels, but it is clear that there are usable consumption theories and models that can provide proxy information for price data and wealth profiles.

⁵³ Painter (2001: 26).

⁵⁵ Allison (1999b: 9).

⁵⁴ Following the calculations of Hopkins (2002 [1995]: 198–9).

⁵⁶ Harris (1993: 28).

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Sewers, Archaeobotany, and Diet at Pompeii and Herculaneum

Erica Rowan

The food economies of Pompeii and Herculaneum were composed of complex networks of interaction that spanned the breadth of the Roman Empire and beyond. In a cyclical manner, these economies were powered by the demands and purchasing power of the elite and middling groups, which in turn, allowed those involved in the food supply to be frequent and important contributors to the local economy.¹ However, before analysing the infrastructure of food production, consumption, and sale, we must first understand which foodstuffs were available. The excellent state of preservation of these two towns has provided archaeologists with a wide array of evidence, and where the archaeological evidence is lacking, the ancient authors can help to fill in the gaps.

Direct evidence for the range of available foodstuffs within Pompeii and Herculaneum consists of the physical food remains themselves. Although early excavators were not particularly interested in ancient diet, they did note when large quantities of an item were found; for example a *dolium* of grain or an amphora filled with fish bones. More recent projects have incorporated environmental sampling into their excavation strategy and, consequently, a much larger range of foodstuffs has been identified in recent years. In 2006, Michele Borgongino published *Archeobotanica*; a catalogue of all the known food finds from Pompeii, Herculaneum, and the surrounding villas, including all the items in the depository at Pompeii.² Excavations at the Casa di Amarantus, the Casa dei Postumi, and the Casa degli Epigrammi Greci by Mark Robinson have produced carbonized and mineralized material related to pre-Roman Pompeii, domestic burnt offerings, and everyday food consumption.³ The Pompeii *Pistrina* Project assessed both diet and fuel use in the bakeries of

¹ See Chapter 2 (this volume) for a definition of the middling group.

² Borgongino (2006).

³ Robinson, M. (1997; 1999; 2002).

Pompeii.⁴ The Anglo-American Pompeii Project's work in Insula VI 1, now completed, also yielded a wide variety of archaeobotanical finds and, as the archaeologists sampled all contexts, their data have also provided crucial information about botanical 'background noise'.⁵ Current archaeobotanical sampling and analysis is still ongoing as part of the University of Cincinnati's Pompeii Archaeological Research Project: Porta Stabia.⁶

The largest single deposit of food finds from the Bay of Naples comes from the *Cardo V* sewer in Herculaneum. Instead of collecting and draining rainwater, this sewer was fed by the latrine shafts in the apartments and shops of Insula Orientalis II (Figure 4.1).⁷ As a result, the sewer is the equivalent of an enormous cess pit and, due to a slow downward movement of the material towards the coast, it must also be considered a single archaeological context.⁸ In 2007, a team from the University of Oxford processed 1,140 litres of material through sieving and flotation.⁹ The eruption of Vesuvius in AD 79 and the subsequent burial of Herculaneum under pyroclastic material meant that the preservation of the *Cardo V* bioarchaeological assemblage was excellent. Along with carbonized material, a wide array of mineralized seeds, fish bones, fish otoliths, seashells, and eggshells have been recovered.¹⁰

In addition to the archaeobotanical material from the Vesuvian sites, there are the data produced by pollen analysis. Pollen grains identified from numerous Pompeian gardens, the Villa Boscoreale, the so-called Villa of Augustus, and Naples harbour have increased our understanding of the range of plant taxa that was growing in the area. Although the results are still somewhat problematic, these data are helpful in establishing the presence of cultivated trees or vines such as olive and grape both inside and outside the towns.¹¹ Finally, we have the artefacts related to food processing, trade, and production. Mill stones, olive and wine presses, and sunken *dolia* attest to the production of flour, wine, and olive oil in the Bay of Naples.¹²

⁴ Monteix (2009); Monteix et al. (2012).

⁵ Ciaraldi (2007); Murphy, Thompson, and Fuller (2013).

⁶ Ellis and Devore (2009; 2010).

⁷ In 2007, the Herculaneum Conservation Project (HCP) excavated the sewer in order to put modern pipes into the tunnel to drain rainwater from the site while simultaneously minimizing disturbance to both the above- and below-ground archaeology (HCP Scientific Committee (2010)).

⁸ While the liquid contents of the sewer drained away towards the beach, there was no outflow pipe for the solid contents and thus the sewer would have to be cleaned out periodically (Camardo 2006–7).

⁹ The material was identified and assessed by the author as part of her D Phil. thesis (Rowan, 2014a).

¹⁰ Rowan (2014a); Robinson and Rowan (2015).

¹¹ Dimbleby and Gröger (2002); Allevato et al. (2010; 2012); Ermolli et al. (2014). It is problematic because many of the early pollen studies failed to identify contamination by modern pollen.

¹² Brun (2004: 12–24); Monteix (2010: 133–67).

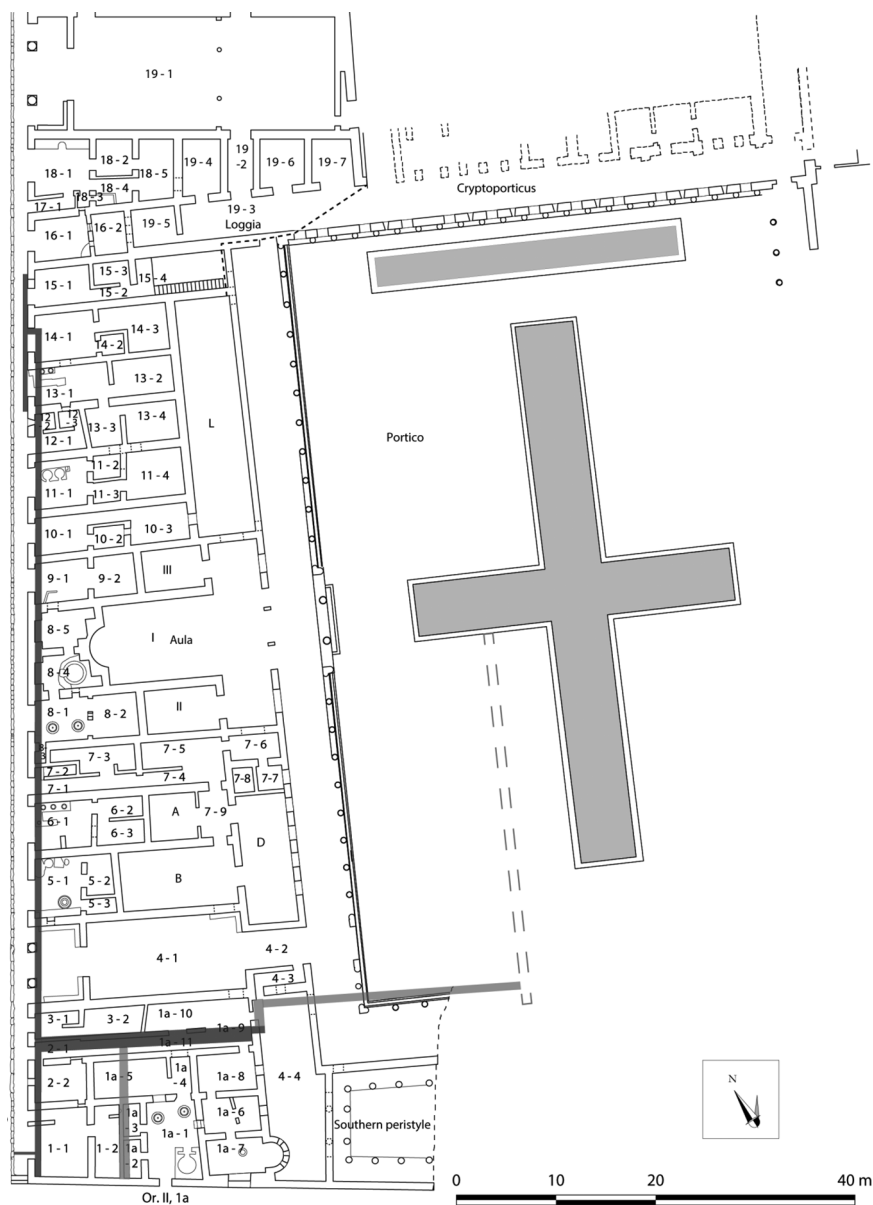


Figure 4.1 Plan of the Cardo V sewer. The north-south branch runs parallel to the Cardo V, beneath Insula Orientalis II. Map: Erica Rowan.

LOCAL FOOD PRODUCTION

The food economies of Pompeii and Herculaneum cannot be understood without first determining where the food was coming from and what was available at particular times of the year. Origin of production and ease of availability will have had an enormous impact on cost and, consequently, on who could afford a particular food item and when.

The integration of various lines of evidence, including ancient written sources, charcoal studies, pollen, and geophysical analyses, has been used to reconstruct the agricultural and horticultural activities taking place in Roman Campania.¹³ Our knowledge of the products produced by the local villas is limited to those that required large processing equipment, usually made of stone; namely vats and presses for wine and olive oil, and threshing floors for grain. Some archaeobotanical work has been done on material from the villas, including pollen analysis from Oplontis, work on the root voids from a vineyard at the Villa at Scafati, and charcoal remains from the Villa of Augustus.¹⁴ These studies have helped confirm what the archaeological and geological work has concluded: that cereals and vines were cultivated on the fertile plains while the less suitable areas for cereals, such as the slopes of Vesuvius, were used for olive groves and, in particular, high-quality vineyards.¹⁵ Current research, however, has not yet been able to provide a clearer picture on the cultivation of specific staple crops (emmer wheat, bread wheat, millet) and instead we must turn to the ancient sources for a more detailed description of Campanian cereal and legume cultivation.¹⁶

For several centuries the Campanian region was important both politically and culturally, and thus Italy and Campania feature heavily in ancient descriptions and discussions of food. Beginning with Cato in the second century BC, a range of authors mention foods grown in or directly imported to Campania or southern Italy.¹⁷ According to Pliny, emmer wheat and millet (both Italian and foxtail) grew well in Campania, and there is no reason to doubt that claim.¹⁸

¹³ Mariotti Lippi (2000); Foss et al. (2002); De Pippo et al. (2006); De Pippo, Donadio, and Pennetta (2008); Mariotti Lippi and Bellini (2006); Veal (2009; 2012); Ermolli et al. (2014). As the present chapter focuses on plant and fish remains, meat will not be included, although the following discussion is equally applicable to the producers, suppliers, and preparers/preservers of meat.

¹⁴ Dimbleby and Gröger (2002); Allevato et al. (2012); Mark Robinson, pers. comm., 5 October 2014.

¹⁵ For a detailed discussion of land use see Chapter 1 (this volume); Allevato et al. (2012: 404); De Simone (2014). Pliny (*N.H.* 3.60–1) mentioned a similar division of land for the area around Vesuvius.

¹⁶ Unfortunately, cereals do not produce large amounts of windblown pollen and thus do not show up in the little pollen that survives in the Vesuvian archaeological record. Additionally, pollen can often only be identified to family, and the Poaceae family, which includes cereal crops, also includes hundreds of species of wild grasses (Dimbleby and Gröger 2002: 181–2).

¹⁷ Cato, *Agr.* 8; Colum. 2.10.18, 8.8.8; Plin. *N.H.* 18.76–7; Galen, *Alim. Fac.* 6.524.

¹⁸ Plin. *N.H.* 18.99–102, 18.109.

Barley may also have been grown locally but was probably used as animal fodder.¹⁹ Legumes such as lentil and broad beans were grown for food but could also be ploughed back into the soil to prevent nutrient depletion.²⁰

The farms in Campania also practised horticulture. The Vesuvian region is mentioned as having its own variety or particularly good cultivar of several fruits and vegetables, including a Herculaneum fig, a Plinian cherry, and a Falernian pear, as well as onions and cabbages.²¹ The climate in Campania was suitable for growing grapes, olives, and most of the fruits and nuts we find in the archaeobotanical record.²² These include apples, pears, plums, cherries, walnuts, and pine nuts. Pliny claims that hazelnuts were roasted in Campania.²³ Importantly, he also notes when particular items had to be imported, such as dates, and therefore we have a good understanding which fruit and nut trees grew and produced fruit in Italy and which grew abroad.²⁴

Campania has undergone significant changes in agricultural practices and crop choices within the last two centuries. Fishing in the Bay of Naples however, and the range of available species, has changed very little since antiquity. Many of the same fish and shellfish species are still consumed in Campania today and, while the number of individuals of certain fish species may have changed, their migration patterns have not altered much over the centuries. For example, horse mackerel still migrate towards the shore in the summer to spawn.²⁵ Consequently, by combining ecological and ethnographic data with the ancient sources and ancient shellfish and fish remains, it is possible to assess the range and availability of seafood consumed in Pompeii and Herculaneum.²⁶

While the fertility of the region meant that much could be produced or gathered locally, the Bay of Naples did not have a closed food economy. Our current understanding of the Pompeii and Herculaneum food economies is that while cereals were grown in the area, not enough was produced to feed the population of Campania.²⁷ The area relied partially, in the first century AD, on

¹⁹ Plin. *N.H.* 18.71–81.

²⁰ Plin. *N.H.* 18.120. The degree to which green manuring took place in Campania is unknown, but the ubiquity of lentil and broad beans in archaeobotanical assemblages from Pompeii and Herculaneum suggest that they were frequently grown for human consumption.

²¹ Cato, *Arg.* 8.1; Colum. 10.127–39, 12.10.1; Plin. *N.H.* 15.53, 15.71, 15.102–4, 19.140.

²² Borgogino (2006), Murphy, Thompson, and Fuller (2013); Rowan (2014a). For a detailed account of grape varieties see Chapter 1 (this volume).

²³ Plin. *N.H.* 15.88–9.

²⁴ Plin. *N.H.* 13.26, 42–50. For a detailed discussion of woodland in the Campanian region see Chapter 1 (this volume).

²⁵ Davidson (2012).

²⁶ Froese and Pauly (2013); Rowan (2014a; 2014b).

²⁷ See Chapters 1 and 2 (this volume), although I do not believe as much viticulture was practised in Campania as is suggested by De Simone in Chapter 1. The ubiquity and frequency of the fruit seeds recovered from the Cardo V sewer suggests diverse and frequent fruit consumption, including apple, pear, and blackberry. As fruit are more difficult to transport than wine or grain and spoil far faster, a larger percentage of land than De Simone suggests was probably dedicated to horticulture.

grain shipments from Egypt. The ships carrying grain for Rome docked at Puteoli and it would be easy enough for grain to be shipped to the nearby towns. It is probable that some of the legumes, such as chickpea, lentil, and broad bean, were also imported from Egypt. The Sulpicii Archive, found at nearby Moregine, indicate that some of the grain and pulses that arrived into Puteoli were not shipped on to Rome but were kept to feed the local population.²⁸ Two of the tablets, dated to AD 37 and AD 40, state that over 10,000 and 13,000 *modii* of Alexandrian wheat and pulses were held as collateral for a loan in the Horrea Bassiana in Puteoli.²⁹

Aside from cereals and legumes, the vast majority of the staple and non-staple food items, including fruits, vegetables, and seasoning, could have been and probably were produced in the area. The olive groves, and certainly the vineyards, provided people with sufficient amounts of wine and olive oil.³⁰ As the amphora data show, in addition to these local products, wine was imported from around the empire, and, in particular, west-central Italy.³¹ Orchards inside Pompeii and on the nearby villas grew numerous types of fruit and few varieties had to be imported.³² Herbs could be grown in private gardens, with the surplus being sold on the streets, or they could be grown in quantity at villas or even collected as wild plants on roadsides. Thus, although there is evidence for some foreign imports, the Pompeii and Herculaneum food economies were primarily internal economies, functioning on a local scale. This does not mean that they were small or insignificant. These were two densely populated urban centres, where the majority of the population lived above subsistence level and perhaps a quarter were able to purchase goods associated with elite culture.³³ As the following discussion will show, the consumption of a diverse diet was considered to be of great cultural importance and people used their buying power to sustain substantial food markets.

THE FOOD REMAINS FROM POMPEII AND HERCULANEUM

In terms of diet, the Vesuvian area was a rarity in the Roman world. Pompeii and Herculaneum were not only situated in a fertile area that had easy access to marine resources, they were also close to the large port of Puteoli. In addition to receiving grain shipments Puteoli was a frequent stopping

²⁸ Rickman (1980: 262–3).

²⁹ Casson (1980: 28).

³⁰ Chapter 2 (this volume).

³¹ De Sena and Ikäheimo (2003).

³² Mariotti Lippi (2000); Dimbleby and Grüger (2002); Mariotti Lippi and Bellini (2006).

³³ See Chapter 1 (this volume) for a discussion of purchasing power in Pompeii as well as a population estimate.

point on the way to Rome, the thus residents of the Bay of Naples probably had the opportunity to purchase many of the food items available in the capital. This hypothesis of a privileged location is supported by the human skeletal data.³⁴ The Pompeii and Herculaneum skeletons cannot be used as a proxy for Roman Italy or the Roman Empire.³⁵ People from both towns were slightly taller than modern Neapolitans, indicating that these people were not exposed to many environmental stressors during the primary growing periods, particularly adolescence. Their heights also indicate that they consistently had access to an adequate amount of food and nutrients, especially protein.³⁶ A quick overview of the food remains from Herculaneum and Pompeii reveals a diet that was not only diverse, but, more importantly, consistently diverse among people of differing socioeconomic status.

While Pliny's claim that bread wheat dominated flour and bread production may be true, it is clear that other cereal types were also consumed.³⁷ Three varieties of wheat (einkorn, emmer, and bread wheat), two species of millet (Italian and foxtail), and barley, were found carbonized at Pompeii and Herculaneum.³⁸ In addition to the cereals, there were several species of pulses available, including chickpea, broad bean, bitter vetch, pea, and lentil. The seeds and stones of over twenty different types of fruit have been identified in the archaeobotanical remains from the two sites. Fruits include apples, pears, grapes, figs, olives, cherries, plums, peaches, blackberries, and mulberries. Carbonized nut shells provide evidence for the consumption of walnuts, hazelnuts, almonds, and pine nuts. Herbs and seasoning consisted primarily of seeds from easily cultivated plants such as fennel, dill, coriander, and mint.³⁹ Although somewhat less flavourful, celery and cabbage seeds were also used. A fragment of carbonized bread with poppy seed impressions was recovered from a burnt offering pit in the Casa di Amarantus and confirms Pliny's statement that poppy seeds were used as a bread topping and flavouring.⁴⁰

³⁴ These finds are also in line with Flohr's hypothesis in Chapter 2 (this volume) that Pompeii had a strong consumer market and that few individuals lived at the poverty line.

³⁵ Koepke and Baten (2005); Lazer (2009: 183).

³⁶ Capasso, D'Alessandro, and Bartoli (2001: 924–7); Bisel and Bisel (2002: 455); Lazer (2009: 179–84). There is debate amongst osteoarchaeologists regarding the height of the Herculaneum individuals (Luca Bondioli, pers. comm., 13 November 2014). Nevertheless, even if they were the same height as modern Neapolitans, instead of taller, this still indicates a stable and adequate diet with regards to nutrient content.

³⁷ Plin. *N.H.* 18.20. As it is less suitable for bread, emmer wheat was probably consumed as a type of porridge.

³⁸ Robinson, M. (1999); Borgongino (2006); Ciaraldi (2007); Fairburn (2012); Murphy, Thompson, and Fuller (2013); Rowan (2014a).

³⁹ Robinson, M. (1999); Borgongino (2006); Ciaraldi (2007); Matterné and Derreumaux (2008); Fairbairn (2012); Murphy, Thompson, and Fuller (2013); Rowan (2014a); Robinson and Rowan (2015).

⁴⁰ Plin. *N.H.* 19.168; Robinson, M. (1999: 97).

The best evidence for fish and shellfish consumption comes from the Cardo V sewer at Herculaneum. A total of forty-five taxa have been identified by the author and Rebecca Nicholson, the largest range of fish species recovered from a single site in the Vesuvian area. Sea breams, horse mackerel, sardines, and anchovies were particularly popular, although larger fish such as sea bass, eels, sharks, and rays were also eaten.⁴¹ There were also thirty-two taxa of edible shellfish recovered from the sewer. Wedge shells, limpets, sea urchins, and land snails were found in the greatest quantities, suggesting that they were the most widely eaten. However, murex, oysters, and scallops were also regularly collected and consumed.⁴²

By using shell thickness measurements, it was possible to determine that eggs from two different bird species were available in Herculaneum: domestic fowl and domestic goose.⁴³ The dominance of chicken egg in the shell assemblage is in line with the faunal evidence, which also records chicken as the most common type of bird bones found in Pompeii.⁴⁴

As stated in the section 'Local Food Production', it is highly probable that some grains and legumes were imported from North Africa and Egypt. Although, at the moment, it is impossible to categorically confirm this hypothesis from archaeobotanical material, there are certain foodstuffs that we know must have been imported from outside Italy. Dates were brought over from Syria, Judea, or North Africa, while sesame seeds were imported from either Egypt or India.⁴⁵ Both the archaeological evidence and the ancient sources attest to the importation of black pepper from India.⁴⁶

As this brief overview has shown, the residents of Pompeii and Herculaneum ate an enormous variety of foodstuffs. Since the Cardo V sewer in Herculaneum contains the largest variety of material from a single context, it will be used as the basis for the following discussion.

FOOD AND THE MARKET

Several Roman authors claimed that self-sufficiency was a highly desirable goal.⁴⁷ The ability to be self-sufficient indicated elite status through agricultural wealth, freedom from the market, and the adherence to traditional Roman values. Yet these descriptions of self-sufficiency were no more than a literary *topos*, designed to counteract the perceived corrupting influence of

⁴¹ Nicholson (1997); Andrew Jones (pers. comm., 23 March 2011); Rowan (2014b: 67).

⁴² Rowan (2014a).

⁴³ Keepax (1981: 323); Sidell (1993: 13); Boyer (1999: 330); Rowan (2014a).

⁴⁴ Watson (2002: 381). ⁴⁵ Dalby (2000: 113); Cappers (2006: 125).

⁴⁶ Plin. *N.H.* 12.27–8; Cappers (2006: 114–17, 125); Robinson and Rowan (2015).

⁴⁷ E.g. Varro *RR* 1.22.1; Plin. *N.H.* 18.40, Juvenal, *Satire* XI.

foreign goods.⁴⁸ In reality, everybody needs to eat and what you cannot grow or collect yourself you must obtain through some sort of exchange. This does not necessarily always mean purchasing items with money: goods can be bartered, labour can be provided, and services rendered.⁴⁹ The environmental remains from the sewer at Herculaneum contained 114 different edible foodstuffs, indicating not only a near impossibility of self-sufficiency, but also the powerful desire to consume a diverse diet that included foreign ingredients.⁵⁰ Owning large tracts of land in fertile Campania would have made self-sufficiency easier, but in order to consume all of the foodstuffs recovered from the sewer without purchasing a single item, such as black pepper, would have been extraordinarily difficult. Consequently, most people were, in some way or another, reliant on the market for their foodstuffs, even the elite, especially if they wished to consume the variety of goods found in Herculaneum.

The Consumer

The people who lived in *Insula Orientalis II*, the building located above the *Cardo V* sewer, were not the wealthy elite. The ground floor of *Insula Orientalis II* hosted a range of shops and workshops, including a *taberna* that sold dried and possibly cooked foods, a wine shop, a bakery, and a gem and lathe workshop.⁵¹ The back and upper-floor rooms, and mezzanine levels associated with each shop, were used as storage and domestic spaces (see Figure 4.1). Shops and their domestic spaces ranged in size from 46.2 m² at II 16 to 97.1 m² at II 6.⁵² Part of the first and all of the second floor may have been occupied by a single large apartment, 848 m² in size, although it is more likely that it was divided into smaller units.⁵³ Nevertheless, the individuals living exclusively on the upper floors had considerably more domestic space than those living in their shops below and were probably somewhat wealthier. If we are to believe the ancient sources such as Galen, and especially anecdotal evidence from authors such as Juvenal and Martial, we would be under the

⁴⁸ Gowers (1993: 18–19).

⁴⁹ There is also household distribution (i.e. to slaves), but, nevertheless, the food for the slave must come from somewhere.

⁵⁰ The food finds consisted of: seven cereal, three legume, three nut, thirteen fruit, nine herb, two egg, forty-five fish, and thirty-two shellfish species. Foreign goods included black pepper and dates (Rowan, 2014a).

⁵¹ Maiuri (1958: 462–3); Monteix (2010: 74, 125–6, 278).

⁵² Andrews (2006). The bakery at II 8 was the largest unit at 110.2 m², but had no associated domestic space.

⁵³ Andrews (2006).

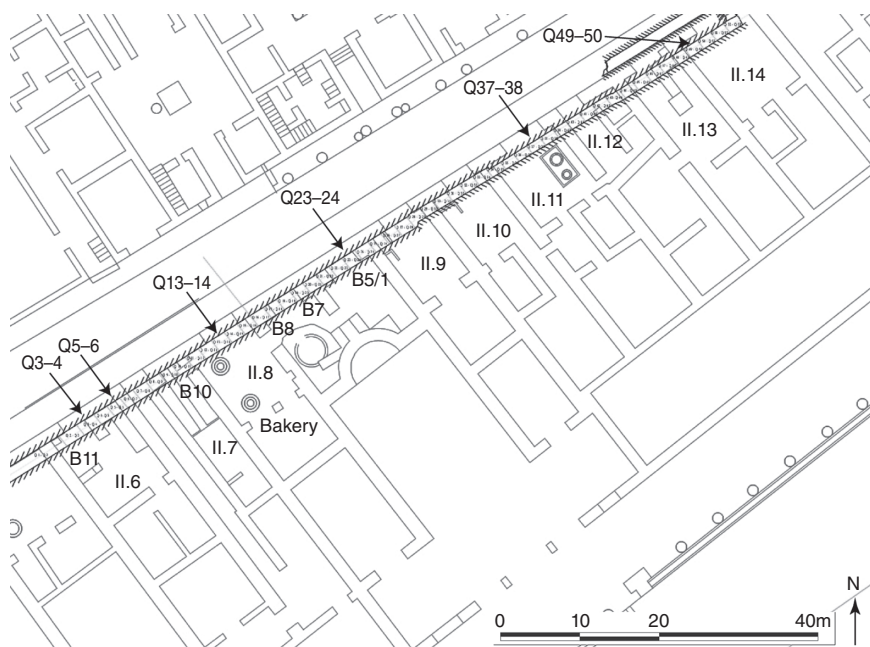


Figure 4.2 Excavation quadrants within the Cardo V sewer. Arrows indicate quadrants where the biological material has been sorted and identified in full (excluding the faunal remains). Map: Erica Rowan.

impression that the people who owned or lived in II 7 ate a rich, plentiful, and diverse diet filled with exotic imports, expensive fish, and soft white bread, while those in the smaller units survived primarily on coarse bread, bacon, wine, and olive oil.⁵⁴ Without the evidence from the sewer, by using only the architectural and artefact remains, this is a logical assumption.⁵⁵ Yet it is incorrect.

The bioarchaeological material found in the Cardo V sewer was originally deposited vertically through latrine shafts, and then, owing to the downward slope of the sewer, it moved horizontally. When the sewer was excavated in 2007 it was divided up into fifty-three 1-metre quadrants running from shops *Insula Orientalis* II 6 to II 14 (Figure 4.2). Each of the quadrants was excavated based on the stratigraphy of the whole sewer, with similar layers receiving identical identification numbers. Hence Q13–14, US40 refers to quadrant 13–14, stratigraphic layer 40, while Q23–4, US40 refers to quadrant 23–4, stratigraphic layer 40. The biological material from six quadrants, spaced

⁵⁴ Wilkins and Hill (2006: 51–60). See especially: Galen, *Alim. Fac.* 1.2 (trans. Powell), Juv., V, and Mart. Fidanza (1979: 88–9); Sippel (1987: 49–50); Garnsey (1999: 37, 43–4).

⁵⁵ This *insula* block was excavated in only six years and the finds were very poorly recorded.

along the length of the sewer, has been sorted and identified in full (excluding the faunal remains but including the fish and shell material).⁵⁶

The quadrants, strata, and samples were analysed individually and together as part of the author's dissertation.⁵⁷ All the identified bioarchaeological material displayed a remarkable level of consistency when diversity, abundance, and ubiquity scores were calculated. These findings suggest that the preservation conditions within the sewer were stable. For example, mineralized material was able to form throughout. Consequently, differences in ubiquity and abundance scores represent true differences in the consumption and use/deposition of the foodstuffs and not the effects of taphonomy. In other words, quantitative and spatial analyses of the quadrants and strata can inform us about the nature of the diets of those living in *Insula Orientalis II*. The strata represent deposition over space and time while the quadrants function as a vertical snapshot of these depositional activities.

The ubiquity scores for all the forms of bioarchaeological material were generally low and most foodstuffs were found in a limited number of quadrants and strata. However, certain items, such as millet, grapes, figs, apples, and limpets, were particularly abundant and ubiquitous in both the quadrants and the strata. These findings strongly suggest that those living in the apartments above the sewer ate a diet comprised of a few staple foods (high ubiquity), supplemented on a frequent basis by a wide variety of fruits, nuts, seasonings, and seafood (low ubiquity).

The southerly slope of the tunnel meant that material moved in only one direction. If it were true that the wealthy inhabitants of II, 7 were the only people eating a wide range of foods then all the quadrants north of its latrine pipe (from the study quadrants this would include Q37–8 and Q49–50) would have had low diversity levels and be lacking in expensive items. Instead, there was a high level of diversity of items throughout the length of the sewer (Figure 4.3). We find many of the same food items in the northern end of the sewer as we do in the southern end, even expensive items such as black pepper. Therefore, the inhabitants of *Insula Orientalis II*, regardless of apartment size, for the most part ate the same foodstuffs.⁵⁸ This consistency with regards to dietary diversity also suggests that representations of status through food were displayed by eating a particular species of a widely consumed food group. The eggshell remains are the clearest example. The sewer contains thousands of chicken egg fragments but only two goose egg fragments, suggesting that the latter was a rare and therefore more valued item. Unlike chickens, geese do not lay eggs all year so there would be fewer available for purchase, which in turn would drive up the price.⁵⁹ Thus it was not eggs, but the type of egg, that was important for displaying wealth and status.

⁵⁶ Thus the faunal remains will not be included in the following discussion.

⁵⁷ Rowan (2014a).

⁵⁸ Rowan (2014a).

⁵⁹ Hamre (2008).

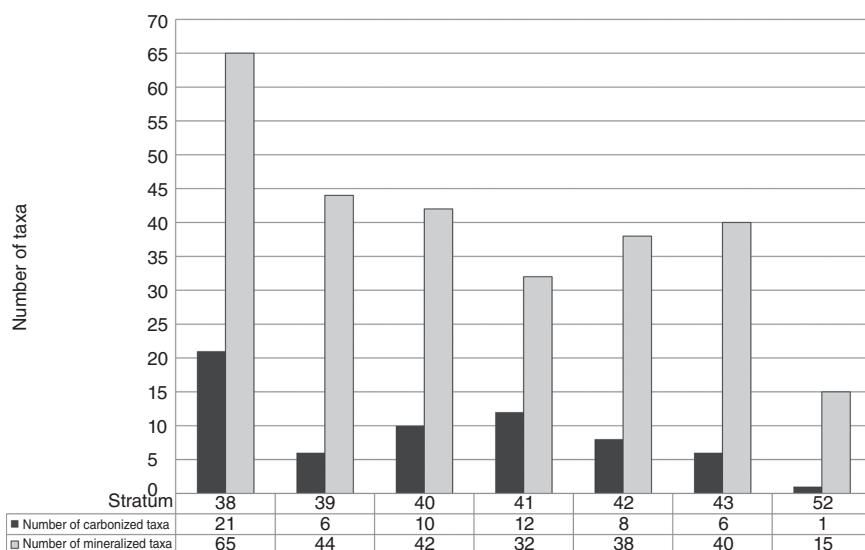


Figure 4.3 Ubiquity of the mineralized material from the Cardo V sewer by stratigraphic layer and quadrant. Chart: Erica Rowan.

The food finds from Pompeii, with some small differences, are, for the most part, the same, and dietary diversity was high. A slightly wider variety of foodstuffs have been found at Pompeii than at Herculaneum, but as a larger number and range of contexts have been sampled for bioarchaeological remains, this is not unexpected.⁶⁰ Current research is focusing on small urban dwellings and workshops but food finds from Pompeii have traditionally come from the larger houses such as the Casa dei Postumi, the Casa di Amarantus, and the Casa delle Vestali.⁶¹ While it is difficult to know if those of middling and lower groups ate exactly the same variety of foodstuffs as those living in Insula Orientalis II, dietary diversity amongst those living in the larger houses helped ensure that a steady supply of goods came into the city. Moreover, it is probably safe to assume that the fertility of the surrounding land and sea contributed to keeping food quantities relatively high and transport costs down.⁶² When the range of residential types from both Pompeii and Herculaneum is combined with all the archaeobotanical and fish data, we see a variety of foods being consumed throughout both cities on a scale that suggests that the middling and even lower socio-economic groups were purchasing food at a level above subsistence and had enough funds occasionally to purchase more expensive goods such as black pepper.

⁶⁰ Rowan (2014a).

⁶¹ Robinson, M. (1997; 1999); Ellis and Devore (2010); Monteix et al. (2012); Murphy, Thompson, and Fuller (2013).

⁶² Garnsey (1999: 14).

The Producer

In order to maintain the buyer's range of selection, the food sector of the Pompeian and Herculaneum economies must have been substantial and employed numerous individuals. The locations and mechanics for the sale of food within Pompeii and Herculaneum have been well documented but never reconciled with the bioarchaeological evidence for diet.⁶³ In other words, now that we know more precisely what people were eating, we can more accurately analyse the size and breadth of the food economy in the Bay of Naples. Due to the vast quantities of archaeological evidence from the Roman world for the production and trade of cereals, wine, and olive oil—for example, millstones, Egyptian papyri, and amphorae sherds—scholarship on the Roman economy often focuses on the mechanics associated with supplying and distributing these staple foodstuffs.⁶⁴ While these foods were of equal importance in Pompeii and Herculaneum, the range of food items recovered from the Vesuvian area clearly demonstrates that several groups of people were engaged in food production and trade activities that did not centre on the Mediterranean triad. These individuals and their areas of specialization were often responsible for making this variety of foodstuffs available for purchase. Moreover, their respective incomes made important contributions to the buying power of the middling and even lower socio-economic groups.

Fishermen are the most obvious and easily identifiable example of non-staple food producers whose jobs both supported and necessitated a thriving food economy. In light of the excellent ichthyofaunal data gathered from both Pompeii and Herculaneum, indicating that almost all individuals consumed a range of fish species, it is worth looking in detail at this sector of the food economy. In addition to the forty-five taxa of fish recovered from the sewer in Herculaneum, another nineteen taxa have been identified from Pompeii.⁶⁵ These fish range in size from a few centimetres to almost a metre in length—a sardine to a sea bass—and exhibit a range of behavioural characteristics. Some of the species, such as red sea bream, spend their whole lives close to the shore, while others, such as sea bass, only come closer to the shore from the deep waters during the summer months.⁶⁶ While most of the identified species could be caught right from the shore or from small boats, ten of the forty-five Herculaneum species, such as the European pilchard, spent part of the year in the Sarno estuary. Thus, there were two major fishing locations in the Bay of Naples: the coast and the estuary.⁶⁷ Finally, species such as anchovies live in

⁶³ Frayn (1993); Ellis (2004); MacMahon (2005); Stefani (2005); De Ruyt (2007); Monteix (2010); Holleran (2012: 141–9). Rome has been particularly well studied—see Holleran (2012).

⁶⁴ Rathbone (2009: 314–23); Harris (2011: 162–6); Temin (2013: 95–138).

⁶⁵ Nicholson (1997); Locker (1999); Reese (2002).

⁶⁶ Froese and Pauly (2013). ⁶⁷ Rowan (2014b: 67).

schools while others such as the conger and moray eel are solitary species.⁶⁸ These differing species characteristics meant that multiple types of equipment such as long lines, casting nets, spears, and traps had to be used to catch all of these taxa.⁶⁹ The profession of fishing in the Bay of Naples required a considerable investment in equipment.⁷⁰ It is therefore unreasonable to assume that fishing was done alone (it could not be in the case of seine nets) or that a single individual practised all the types of fishing require to catch these various taxa. There must have been some degree of cooperation and organization. Such cooperation is epigraphically attested, if not at Pompeii itself: an inscription from the city of Parium, located on the Hellespont, describes a group of tuna fishermen with a considerable collective investment in the boats, nets, and lookout points required for catching the migratory tuna that passed between the Black Sea and the Mediterranean.⁷¹ The sixty-four total fish taxa from Pompeii and Herculaneum, many of which were probably consumed fresh,⁷² suggests that there was a considerable number of people in the area who made their living from the fishing industry. Returning to the example from Herculaneum, the recovery of otoliths (fish ear stones) from five of the six study quadrants and all stratigraphic layers of the *Cardo V* sewer, in addition to thousands of fish bones, indicates that fish were eaten widely across space and time by the majority of the people living in *Insula Orientalis II*. Thus, fish had to be a relatively inexpensive and easily available item, which in turn suggests that there was a significant volume of fish for sale.

In addition to the fishermen, there are those that made and sold fish sauce. We know that Aulus Umbricius Scaurus was the primary producer of fish sauce in the region, as 29 per cent of the *garum* jars found in Pompeii and Herculaneum bear his signature.⁷³ The mosaics in his house also attest to his production of a number of fish sauce variants, including *garum* and *liquamen*.⁷⁴ A study of the ceramics from the *Casa delle Vestali* by De Sena and Ikäheimo has shown that, from AD 50–79, the number of fish sauce amphorae from the Iberian peninsula increased significantly.⁷⁵ Consequently, the inhabitants of these two towns could not only choose between a variety of species of fresh fish, but also between local or imported fish sauce (and, within that, particular varieties of fish sauce). If we take this example to the extreme,

⁶⁸ Froese and Pauly (2013).

⁶⁹ Muñiz (2010); Marzano (2013: 29–36).

⁷⁰ This does not even take into account the constant repairs that would have had to take place. Since nets were made out of vegetable fibres they did not last long and would have to be replaced every few years (Giner 2010: 65–6).

⁷¹ Frisch (1983); Marzano (2013: 42).

⁷² The evidence for fresh fish comes from the presence of otoliths in the *Cardo V* sewer. Otoliths are extremely delicate and, while they will not survive the fish-salting process, they will, if the fish is fresh, survive short-term boiling or frying as well as human consumption (van Neer et al. 2002: 62; Rebecca Nicholson, pers. comm., 4 April 2012).

⁷³ Curtis (1984: 561); Cooley and Cooley (2013: 250–1).

⁷⁴ *CIL* 4.5694, 5711.

⁷⁵ De Sena and Ikäheimo (2003: 314–15).

then the fishing industry incorporates the fishermen, Umbricius and his freedmen and slaves, the Iberian fishermen, the men that ran the fish-salting factories in Spain, and, finally, the potters that made the amphorae for shipments to both locations. By applying Poehler's theory for household and commercial modes of cart ownership to fishing boats, we can then conclude that those catching the fish were not the same as those making the fish sauce.⁷⁶ A fishing boat is a sizable investment and it would be extremely inefficient to own one for the sole purpose of catching fish for garum production. As the ichthyofaunal evidence from Lusitania has shown, only a few species were used to make fish sauce, notably sardines and anchovies, and these were migratory species.⁷⁷ Therefore, those that owned fishing boats probably sold their catches to the garum factories when large numbers of sardines and anchovies were present in the Bay of Naples. The remainder of a fisherman's time was no doubt spent catching other species that would be sold fresh in the towns. Finally, we need to add shipbuilders, net weavers, and the craftsmen who made the fishing hooks to the chain of production.⁷⁸

In addition to the fish supply, the black pepper and dates found both in Pompeii and the Herculaneum sewer attest to the area's participation in the supra-regional food market.⁷⁹ The number of people involved in importing the black pepper from India and the dates from the Middle East or North Africa is too long to enumerate, but again highlights the breadth of the food sector and the fact that there were many individuals involved in the food trade who were neither tied to the land nor directly involved in the production of cereals, wine, and olive oil.

The Pompeii and Herculaneum bakers were directly involved in the grain trade but they represent the end of the production line. A baker probably did not own the land his cereals came from, although he might be a freedman or slave of the individual who did own the farm. Assuming that the bakery was connected to an elite household, then the grain used was probably provided by that household's nearby farm.⁸⁰ However, the baker must also acquire salt. As the ancient sources attest, salt was an essential component in bread.⁸¹ The likelihood that the landowner who grew the cereals also owned salt pans or salt

⁷⁶ Poehler (2011) hypothesizes that carts classified as 'household mode' were only used for the local circulation of goods. Carts falling into this category would have to be used on a frequent basis in order for it to be worth the cost of buying and maintaining it.

⁷⁷ Desse-Berset and Desse (2000: 86–91).

⁷⁸ No doubt the shipbuilders built more than just fishing boats and the hook-makers made more than just hooks, but nevertheless, they were still participating in the food economy.

⁷⁹ Ciaraldi (2007); Robinson (2002; 2007); Rowan (2014a).

⁸⁰ If the grain is coming from abroad, for example Egypt, then the baker must purchase his grain from a merchant.

⁸¹ Plin. *N.H.* 18.104.

extraction facilities is low, and therefore the salt must have come from an outside source.⁸²

Consequently, for those that specialized in a particular area of the food industry even the production of their own goods usually required them to be involved in exchange networks in order to obtain all the equipment and/or ingredients. What is obvious, but also crucial to remember, is that the baker, the fisherman, and the merchant, while involved in the production of food, could not survive on their goods alone. A producer had to rely on the market if he wished to consume the variety of foodstuffs available locally and from abroad. As the ubiquity of the sewer material has demonstrated, at least in Herculaneum, this is exactly what most people did: they purchased and ate a wide range of the available foodstuffs.

ECONOMIC CHANGE

Thus far the bioarchaeological material from the Vesuvian towns has demonstrated that, in the last few decades before the eruption, the people in Pompeii and Herculaneum ate a local but diverse diet. Yet were their diets always characterized by this range of ingredients? Did the food economy change throughout the development of these towns, and if so, how?

The simple answer is yes; the evidence indicates that the food economy did change between the fourth century BC and AD 79. The excavations in the garden of the Casa di Amarantus are one of the few investigations of early Pompeii to produce food remains. It appears that those living in Pompeii prior to the first century BC and those living there in AD 79 consumed many of the same staple foods. Barley, millet, and multiple types of wheat were found in garden deposits of the Casa di Amarantus dating from the fourth to second centuries BC. Some items are notably absent from the deposits, including pine nuts and dates, while foodstuffs such as figs, olives, fish, and shellfish were recovered in only low quantities.⁸³ The increase in olives and figs in the Roman period suggests an increased focus on horticulture, while the presence of dates and black pepper in the Herculaneum sewer serves as evidence for increased trade networks. The low diversity of fish species and the small number of shellfish in the early deposits, especially compared to the material from the Herculaneum sewer, is unusual.⁸⁴ This huge increase in the exploitation of coastal and aquatic resources may have been due to a shift in cultural

⁸² This is equally applicable to salting fish and meat.

⁸³ Robinson, M. (1999: 101–2).

⁸⁴ Robinson, J. (1999: 102); Locker (1999: 94).

taste. Seafood may also have acted as a crucial source of protein to a growing population.

The overall increase in dietary variety must have corresponded to an increase in the number of people working in the food industry: a larger variety of fish meant more fishermen and more equipment (and, in turn, more people making the equipment), while the increased imports of fish sauce, wine, and luxury spices from places such as Spain, North Africa, and India presuppose more merchants and ships.⁸⁵ This expansion in the range of products may be related to the growth in the number of elite coastal villas in the Bay of Naples from the second century BC onwards.⁸⁶ Whatever the cause, it is clear that the food economy grew both regionally and inter-regionally.

These findings are supported by more general research into the economy of the towns. Recent scholarship has shown that there was an increase in overall urban production at both Pompeii and Herculaneum in the first century AD.⁸⁷ Several private houses and apartments were converted into workshops, suggesting an increasing consumer demand for locally produced goods. At *Insula Orientalis* II 8 a bakery was installed between AD 62–79, and the construction of the oven rendered the room above in *Insula Orientalis* II 7 impossible to use.⁸⁸

The greatest internal shift in the food economy took place in realm of agriculture. Both Mark Robinson and Maria Ciaraldi have found carbonized cereal chaff in the early Pompeii deposits. The presence of crop-processing waste indicates that parching, winnowing, and sieving took place onsite. Carbonized chaff has not been found in later deposits, including those from the *Casa di Amarantus* and the *Casa delle Vestali*. There was only one fragment of chaff recovered from the *Cardo V* sewer.⁸⁹ Robinson and Ciaraldi have suggested that this represents a shift that took place in the mid-second century BC from intramural to extramural crop processing.⁹⁰ It is unclear whether or not those processing the crops were also the ones growing the cereals but, nevertheless, it demonstrates that those responsible for cereal preparation originally lived in a semi-urban environment; that the early town had some sort of a crop-processing industry. While grinding flour and baking bread was still an urban activity in AD 79, there were probably no longer individuals in Pompeii or Herculaneum making a living from the raw processing of cereals. Those who processed crops now either lived on their farms (where they processed the grains themselves) or were the slaves and workers at the large rural villas. The fact that individuals living in the Vesuvian towns were able to purchase clean grain for either the production of flour or porridge

⁸⁵ De Sena and Ikäheimo (2003); Ellis (2011b).

⁸⁶ See Introduction (this volume, p. 4).

⁸⁷ Wallace-Hadrill (1994: 138–9); Andrews (2006); Monteix (2010: 353).

⁸⁸ Andrews (2006). ⁸⁹ Rowan (2014a).

⁹⁰ Robinson, M. (1999: 101); Ciaraldi (2007: 150–4).

rather than process their own also attests to the increasingly urban nature of these areas. Clean grain would be carted into Pompeii and Herculaneum on a fairly regular basis and sold or brought to individuals or bakers. Except for milling, cereal production and processing had become entirely extramural by the time of the eruption.

To sum up, from the fourth century BC to the first century BC the urban character of Pompeii and Herculaneum changed and it is likely that, as the towns became increasingly built up, many other aspects of food production also shifted to more rural areas. For example, there is little evidence that people living in Pompeii owned chickens. There is no evidence for chicken coops and there are no large depositions of mature female chickens as there are of equids unable to escape the eruption.⁹¹ Consequently, even basic foodstuffs like eggs were probably brought into town and sold at market. The high rate of fig and olive consumption also suggests that there was a need to import these goods from the surrounding countryside. By AD 79, the orchards and occasional private fruit trees at Pompeii could no longer provide the inhabitants with a sufficient amount of fruit (if they ever had) but, according to the botanical finds, the residents of Pompeii ate a substantial variety and quantity of fruit.⁹² The pollen evidence suggests that trees producing edible nuts, such as walnut and hazelnut, grew outside but not inside the town.⁹³ Thus, the importation of foodstuffs into Pompeii and Herculaneum increased over time, and even if market days did not increase in frequency, the scale of the sale and purchase of food items no doubt grew.

CONCLUSIONS

Food consumption is a biological necessity. As omnivores we must eat a variety of foodstuffs in order to obtain all the requisite nutrients for survival and reproduction. We do not, however, need to eat over a hundred different foodstuffs to survive. The fact that the residents of Pompeii and Herculaneum consumed such a high number of food items was their own choice, and one that was fostered by a vibrant local food economy that took full advantage of the fertility and abundance of the region and the wider empire. While local farms and imported shipments from Egypt, Spain, and North Africa provided residents with the basic staples—cereals, olive oil, wine, and grapes—individuals specializing in other areas of food production contributed

⁹¹ Di Bernardo et al. (2004).

⁹² Robinson, M. (1999); Borgongino (2006); Ciaraldi (2007); Fairbairn (2012); Murphy, Thompson, and Fuller (2013).

⁹³ Mariotti Lippi (2000).

significantly to the number of items available for sale. The fisherman, baker, and merchant sold products that the majority of people could not obtain on their own. Dietary diversity was not only for the elite, as the bioarchaeological remains from the Cardo V sewer in Herculaneum have shown. In order to maintain this type of diet, the lower and middling groups must have had a considerable amount of buying power. In the absence of any sort of self-sufficiency one cannot think solely of producers and consumers, for many urban dwellers contributed either directly or indirectly to the acquisition of these products and the tools required to collect them.

Beginning in the first century BC, the food economy in Pompeii and Herculaneum began to change, becoming even more market-oriented and individualized. The processing and production of most foodstuffs, notably cereals, became an entirely extramural activity, creating a greater necessity for product purchase, which increased the size of the food economy. By the time of the eruption, the inhabitants of Pompeii or Herculaneum could choose between local or provincially produced wine, olive oil, and fish sauce, could buy black pepper from India, and could choose from over fourteen different types of fruit grown on the nearby farms. The number of people involved in supplying the towns with this range of items was immense and the skeletal remains demonstrate that the inhabitants of Pompeii and Herculaneum benefited from this diversity.⁹⁴ It appears that living in the shadow of Vesuvius was both a blessing and a curse.

Despite Pompeii and Herculaneum being neither particularly big nor important towns, the size and breadth of their food economies was rare for the Roman world. The fertility of the region, the proximity of important ports like Puteoli, and the large number of elite consumers in the area meant that there was probably a greater variety and quantity of foodstuffs available there than elsewhere in the empire. This combination of factors is likely to have driven prices down, allowing a larger number of people to afford a wider range of food items. It is hoped that future research, and especially increased environmental sampling, will help us gain a better understanding of the food economy in other Roman towns both in Italy and the provinces.

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⁹⁴ See, on this topic, Chapter 5 (this volume).

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Skeletal Remains and the Health of the Population at Pompeii

Estelle Lazer

It has been claimed that the life of Pompeian individuals ‘was short and full of pain’.¹ This assumption was based on preconceived ideas about Roman health and longevity, not on actual evidence about the inhabitants from the city itself, such as skeletal remains. The present chapter evaluates the skeletal record from Pompeii to assess the health of the Pompeian population, and discusses some of its implications for our understanding of Pompeii’s economic history. This is not a straightforward issue. Establishing health from the ancient skeletal record is fraught with problems and defies simplification. This is especially true of the Pompeian sample, which has been compromised by post-excavation treatment and storage. Moreover, any attempt to correlate the complexities of the assessment of health from ancient skeletal samples with economic success or failure is bound to be problematic.²

The most basic but essential issue to resolve before commencing a discussion about the health of the Pompeian population is the determination of what actually constitutes good health. The World Health Organization’s definition of it—‘a state of complete physical, mental and social well-being and not merely an absence of disease or infirmity’—can hardly be applied to the ancient skeletal record.³ In addition to their inability to yield information about mental condition and the myriad problems in attempting to assess social well-being, human skeletons provide a limited source of information about ancient health: many disorders involve soft tissue and do not present on bone. Further, bone can only respond to insult in a very limited number of ways; it can be lost or resorbed, new bone can be deposited, or a combination of the two can occur. As a result, a number of diseases leave a similar appearance on the skeleton. Acute disorders,

¹ Henneberg and Henneberg (2002: 185).

² Scheidel (2012: 321–31).

³ World Health Organization (2006), 1.

apart from trauma, are not likely to leave any trace on the skeleton. The majority of pathological changes observed on skeletons reflect chronic ailments.⁴

While skeletal evidence only provides a very restricted view, a comprehensive analysis of the Pompeian bones nonetheless reveals clues about the general health of the sample of victims. The presence of certain pathologies and other indicators, like stature, act as health markers and assist in constructing a picture, albeit a rather indistinct one, of the general physical well-being of individuals and the sample as a whole. Apart from elucidating oral health and diet, dental data can provide some indication of underlying health problems, as bacteria associated with dental and other pathology of the oral cavity have been implicated in some soft tissue diseases, such as heart valve problems. Correlation has also been found between dental pathology, particularly periodontitis, and other cardiovascular disease, as well as pre-term low birth rate, diabetes, aspiration pneumonia, and abscesses of the lung. In addition, the bacterium associated with gastric ulcers, *helicobacter pylori*, has been identified in samples of saliva and dental plaque.⁵ Stature is, in part, a reflection of health and nutrition during the growing years. Similarly, bone alterations, such as flattening of the proximal shaft of the tibia and femur, have been interpreted by some physical anthropologists as indicators of stress during the period of skeletal development.⁶ Healed injuries, infections, and other diseases yield information about the status of the immune system, while age-related disorders are a valuable gauge of health, as they do not manifest until an individual has achieved a certain age.

THE POMPEIAN SAMPLE

There are numerous problems associated with attempts to estimate population size for ancient Roman settlements.⁷ In the case of Pompeii, these problems are particularly acute. The size of the site and the wealth of finds have meant that excavation has mainly been confined to the area within the walls. Even though the volcanological evidence suggests that a number of individuals, probably the majority, escaped, limited excavation of the area beyond the walls reveals that a proportion of the population died during their attempted escape. Future excavation will almost certainly yield more victims in the surrounding

⁴ White (2000: 383); White and Folkens (2005: 309–11).

⁵ Meyer and Fives-Taylor (1998: 88–95); O'Reilly and Claffey (2000: 13, 16–18); Gendron, Grenier, and Maheu-Robert (2000: 897–906); Cabell, Abrutyn, and Karchmer (2003); Molloy et al. (2004: 625–6, 631).

⁶ Brothwell (1981: 88); Capasso, Kennedy, and Wilczak (1999: 101).

⁷ See, for example, Scheidel (2007b: 42). For a discussion on the problems associated with attempts to estimate the size of the AD 79 Pompeian population, see Lazer (2009: 73–6); see also Chapter 2 (this volume).

area. The number of victims of the eruption cannot be assessed and estimates that have been made are based on spurious evidence.⁸ In addition, poor documentation in the first hundred years of excavation means that there is no reliable figure for the number of victims who have been uncovered.⁹ It is therefore impossible to determine the percentage of the Pompeian population that is represented from the skeletal remains. Nonetheless, numerous bones are still available for study.¹⁰ Disaster theory, moreover, indicates that destruction events do not discriminate. All sections of a community tend to be affected equally in terms of death and the destruction of property.¹¹ Despite the constraints, the Pompeian victims of the mass disaster caused by the eruption of Vesuvius in AD 79 potentially provide a random sample that is a good reflection of the 'living population'.

The skeletal sample has been compromised, mostly because of post-excavation treatment of the bones, which resulted in both the disarticulation of much of the sample and the loss of information about where individuals were found. Most of the human skeletal remains have been stored in two buildings, which date to the original occupation of the site (Figure 5.1). The tradition of removing skeletons after excavation and storing the co-mingled remains in a building on site, designated as a 'bone house', can be traced back, at least, to the second half of the nineteenth century.¹² Of course, no archaeological dataset is complete. Datasets are always constrained by the accident of what survives over time and the fact that the archaeological record is usually biased towards more durable examples of material culture. The limitations of the sample determine the form of the research design for the study of these victims, especially with respect to pathology. Some skeletons and a number of casts are still in situ, especially in houses excavated from the time of the directorship of Maiuri and beyond. The size of the Pompeian sample and the fact that the deaths occurred as a result of a single event provides a unique opportunity to examine the remains of a 'living' population.

⁸ Lazer (2009: 76–7).

⁹ De Carolis, Patricelli, and Ciarallo (1998: 75–123); De Carolis and Patricelli (2003a: 66–7; 2003b: 111–12) trawled through all the available excavation documentation and could account for at least 1,047 individuals. They expanded this number when the discovery of multiple bodies was implied, and came up with an estimate that about 1,150 skeletons have been found during the course of excavations in Pompeii.

¹⁰ It is very difficult to attempt to establish the minimum number of individuals from the disarticulated sample. More skulls are represented than other bones but a significant number of these are fragmentary and, in some cases, scattered across the area where the bones have been stored on site. Many are nearly impossible to rearticulate. For a more detailed discussion of the problems of estimating the available sample size, see Lazer (2009: 104–5). Henneberg and Henneberg (2002: 170) estimated that the disarticulated bone collections represent about five hundred individuals and that there are also about forty articulated skeletons. They do not state whether this figure includes the skeletal remains encased in the plaster casts.

¹¹ Grayson and Sheets (1979: 626–7).

¹² Nicolucci (1882: 2); Dyer (1883: 479).



Figure 5.1 Skeletons in the Terme del Sarno (VII, ii, 17) collection as they appeared shortly after cleaning and sorting commenced. Photo: Estelle Lazer.

Analysis of the skeletal remains enabled commonly held views about the people who became victims to be tested. It had generally been assumed that they were more likely to have been the old, the infirm, the young, and females.¹³ The assertion that young, healthy males were most likely to survive the eruption was not, however, supported by the skeletal evidence. It appeared that there were roughly equal numbers of each sex represented, with perhaps a slight skewing towards those with male attributes.¹⁴ Similarly, the skeletal evidence did not confirm the notion that the sample would be biased towards those who were old or extremely young. While establishing age at death for adults is much more difficult than adult sex determination, it appeared that a full range of ages was represented, with the exception of very young

¹³ See, for example, Nicolucci (1882: 1); Luongo et al. (2003: 169–200); Chamberlain (2006: 70).

¹⁴ Lazer (2009: 117–37).

individuals. It is possible that the lack of neonatal and infant bones in the sample may, at least in part, be due to a combination of poor storage and the inability of untrained excavators to recognize these bones as human.¹⁵ It is important to note that the skeletons of the people that succumbed to the AD 79 eruption cannot provide information about the level of infant mortality as the victims of mass disasters reflect living populations. In contrast, most skeletal evidence for the Roman world derives from cemetery samples that yield a different image of demography because they reflect individuals who have died either prematurely or at the end of their lifespan. Further, cemetery samples can be skewed by age, sex, or cultural affinities.

There are significant differences between the skeletal sample from Pompeii and that of Herculaneum. Unlike Pompeii, where skeletons were revealed from the first few months of excavation in 1748, most of the Herculaneum skeletons were found from the latter part of the twentieth century and were excavated with a view to full analysis. The excavation of the human victims on the beachfront at Herculaneum was only completed in 2010. To date, 345 victims have been uncovered. Fattore and his colleagues observed that the distribution of victims who took shelter at the beachfront varied by sex and age.¹⁶ More adult males were found on the beach, as compared to higher numbers of women and children in seven of nine barrel-vaulted chambers that have yielded human skeletal finds. This has been interpreted as an organized evacuation with enough time to attempt to provide protection for the most vulnerable groups in the community. They argue that the Herculaneum victims therefore do not reflect a random sample of the catastrophe. As yet, there have been no finds in Pompeii that indicate a large-scale organized evacuation.

The post-excavation disarticulation of the Pompeian skeletal sample made interpretation of pathology particularly challenging. Ideally, diagnoses should be based on an examination of the entire skeleton as some pathology can only be distinguished by the pattern of changes that can be observed on different bones. As this was impossible for the majority of victims, the study was limited to disorders that could be diagnosed with confidence from gross inspection of a single bone, like healed trauma. The types of questions that could be asked of the evidence were further constrained by the lack of access to X-ray facilities and destructive techniques, like sampling for histological analysis.

The more careful and better-documented excavation of the Herculaneum skeletons enabled the diagnosis of a much greater range of disorders from these articulated remains than from the disarticulated skeletal collections in Pompeii. Diseases, including brucellosis and tuberculosis, were reported in the Herculaneum sample on the basis of observed changes to various skeletal

¹⁵ Lazer (2009: 110).

¹⁶ Fattore et al. (2012).



Figure 5.2 Bones stored in the Terme del Sarno (VII, ii, 17) were sorted into piles of left and right bones for each skeletal element to facilitate the skeletal study. Photo: Estelle Lazer.

elements, coupled with the identification of *Brucella* bacteria in a piece of carbonized cheese.¹⁷

In the absence of complete skeletons available for study, and in consideration of the other challenges this material presented, I decided to concentrate on statistical studies based on large numbers of particular bones (Figure 5.2). The bones selected for study were chosen for their ability to provide specific information. For the determination of sex, the best skeletal indicators are the pelvis, femur, humerus, skull, and teeth.¹⁸ Age at death was based on pelvis, teeth, and skulls.¹⁹ Another issue was whether the sample of victims reflected a heterogeneous population, as suggested by ancient writers, who described the inhabitants of Pompeii and the surrounding region.²⁰ The bones chosen for population studies were skulls, pelvises, femora, humeri, and tibiae. Because the skeletons were disarticulated, the femur was chosen as the most reliable single long bone for providing information about stature.²¹

¹⁷ Capasso (1999a: 277–88; 1999b: 463–7; 2000a: 1344–6; 2000b: 1774; 2002: 122–7; 2007: 350–7). For a discussion about these and other diagnoses from the Herculaneum skeletal sample, see Lazer (2009: 196–7).

¹⁸ Bass (1984: 114–15); Krogman and Iscan (1986: 200); Ubelaker (1989: 53); Buikstra and Ubelaker (1994); Lazer (2009: 117–37); White, Black, and Folkens (2012: 408–18).

¹⁹ Lazer (2009: 138–66); White, Black, and Folkens (2012: 381–400).

²⁰ Strabo 5.4.8; Plin. *N.H.* 3.60–2.

²¹ Krogman and Iscan (1986: 310–11); Giannecchini and Moggi-Cecchi (2008: 290); Lazer (2009: 180); White, Black, and Folkens (2012: 418–21).

The most useful skeletal indicators for each feature under study could then be employed as controls for the determination of population norms for the other bone types in the Pompeian sample. For example, because of its biological function, the pelvis is the most reliable indicator of sex. Other bones, such as the femur, humerus, and skull, also reflect sexual dimorphism, but the degree of difference between males and females can vary between populations due to cultural and genetic differences.²² By using the most useful sexual marker as a baseline, it was possible to establish the sex-related parameters for other bones in the Pompeian sample.

Non-metric traits proved to be the most useful population indicators for the Pompeian sample. The extremely high incidence of certain traits in relation to other populations, such as palatine torus, double-rooted canines, and squatting facets of the tibia, suggests a certain level of homogeneity, either as a result of shared genes or a common environment during the years of growth and development.²³ This discovery is at odds with the traditional view that the Pompeian population was heterogeneous.²⁴ It is possible that the various populations which were said to have inhabited the region by ancient writers, like Strabo and Pliny the Elder, were not genetically distinct but were separated by culture and language. The apparent homogeneity of the Pompeian sample could also be due to a possible alteration to the composition of the population by some sections of the community moving from the settlement. This could be either a direct result of the AD 62/3 earthquake or because of disruptions from continuing seismic activity in the last seventeen years of occupation.²⁵ There could also be other reasons for change to the population, as would be expected in any dynamic community with a long occupation history.

INDICATORS OF HEALTH FROM THE POMPEIAN SKELETAL SAMPLE

In what follows, the Pompeian sample will be evaluated using several indicators of health and well-being. The focus will be on dental health, stature, and

²² Lazer (2009: 119–20); White, Black, and Folkens (2012: 408–18).

²³ Lazer (1996; 1997: 111–17; 2007: 613–15; 2009: 223–46).

²⁴ It was generally assumed that the Pompeian population was heterogeneous, since the town was a river port with a long history. Literary evidence has been invoked to support this notion, such as Strabo's description of the different groups that occupied Pompeii over time. Similarly, Pliny the Elder stated that Campania had been inhabited by Oscans, Greeks, Umbrians, Etruscans, and Campanians. The composition of the population would also have been affected by the colony of veteran Roman soldiers that was superimposed onto the population by Sulla as punishment for resisting Rome in the Italic War. Strabo, *Geogr.* 5.4.8; Plin. *N.H.* 3.60–2. Cf. Cooley and Cooley (2004: 17).

²⁵ See Chapter 7 (this volume: 210–12).

trauma, and on three specific pathologies that inform us about the health of the population: porotic hyperostosis, osteophytic change, and hyperostosis frontalis interna (HFI).

Dental Health

Ninety-seven maxillae and eighty mandibles were examined. It would be reasonable to conclude from the number and degree of carious lesions, abscesses, *ante mortem* tooth loss, and the degree of subsequent alveolar resorption and calculus deposition, that oral hygiene, as it is known in modern Western societies, was not practised. In addition, there appeared to be no evidence of dental intervention, with the possible exception of tooth extraction. While not enough evidence exists to draw firm conclusions from the results of an examination of the oral health of the Pompeian sample of victims, this still provides some insight into their general health. As already noted, the high frequency of calculus and other dental problems indicates the potential presence of a number of systemic conditions, such as cardiovascular disease, diabetes, and gastric and respiratory disorders. Further, the presence of some degree of linear enamel hypoplasia on a number of the anterior teeth suggests that a proportion of the sample was exposed to stress, such as serious or chronic illness, during the period of dental development. Due to the high frequency of post-mortem tooth loss, the dataset is too incomplete to determine with certainty whether the degree of dental pathology is correlated with age, though the available evidence is consistent with such a conclusion.²⁶

Stature

Bone inheritance is multifactorial, which means that the ultimate height an individual attains is a compromise between their genetic potential and environmental factors, especially health and nutrition during the years of bone growth. Information about the stature of earlier populations can provide insight into the health status of individuals in a sample.

The height of a human body is directly correlated with limb bone length. Regression formulae have been developed over time by a number of scholars to estimate the stature of individuals from long bone measurements.²⁷ Physical anthropologists have traditionally favoured Trotter and Gleser's formulae for

²⁶ Lazer (2009: 168–79).

²⁷ Bass (1984: 175); Brothwell (1981: 100–2); Krogman and Iscan (1986: 302–12); Trotter and Gleser (1958: 79–123); Ubelaker (1989: 60–3); White (2000: 369–72); White and Folkens (2005: 398–400).

height reconstruction of white males and females, which is based on skeletal material from ancient European populations.²⁸ It should be noted that reconstructions from these formulae only provide a rough guide to the actual height of individuals from an unknown population as they were primarily devised for modern American forensic use. Even when applied to known modern populations, they only produce an estimate of stature with a margin of error of several centimetres.

Measurements of skeletons from archaeological contexts *in situ*, prior to excavation, provide an indication of actual height and can be used as a basis for choosing the most appropriate regression formulae for stature estimation. Scholars working on central and south Italian skeletal samples reported that the most reliable estimates were obtained from the application of the 1899 formulae of Pearson or the 1952 Trotter and Gleser formulae for the group they described as 'American Negroes'.²⁹

Given the difficulties associated with height reconstruction, it has been reasonably suggested that long bone length alone would provide a more reliable indicator of the general health of archaeological populations. This dispenses with the problem of attempting to compare results between scholars who have used different techniques to estimate height.³⁰ The mean femur length for the Pompeian sample was 44 cm for males and 40.75 cm for females (Figure 5.3).³¹ These figures are consistent with those obtained for samples of other Roman skeletal collections in Italy. The mean femur lengths for the Roman samples are noticeably shorter than those obtained from Iron Age and medieval skeletal samples from Italy. The disparity between average femur length in the different eras have been interpreted by Gowland and Garnsey as an indication of health stress during the growing years in the Roman skeletal samples.³²

Pathology: Trauma

Trauma includes various bone injuries, caused by the cutting or piercing of the bone by sharp implements or crushing by blunt objects. It includes fracture. Trauma also includes certain types of surgical intervention, such as amputation, and trepanation or trephination. Trauma is the second most common

²⁸ Bisel (1991: 4); Brothwell (1981: 100–2); Mays (1998: 70); Trotter and Gleser (1958: 79–123); Trotter (1970: 71–83).

²⁹ Becker (1999); Formicola (1993: 351–8); Giannecchini and Moggi-Cecchi (2008: 284–92); Trotter and Gleser (1952; 1977); Gowland and Garnsey (2010).

³⁰ Jongman (2007: 194, graph 7). ³¹ Lazer (2009: 181).

³² Gowland and Garnsey (2010).

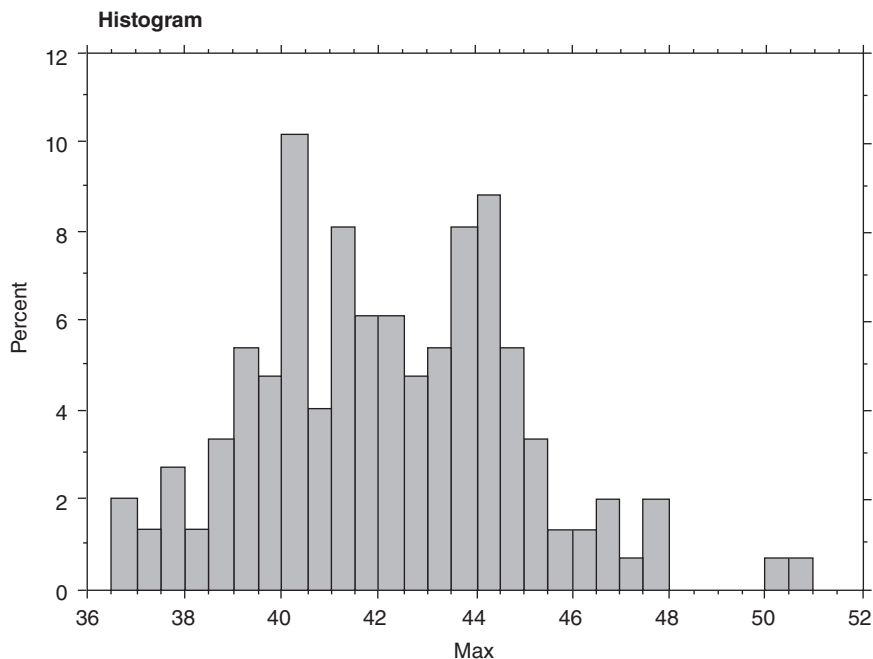


Figure 5.3 Frequency histogram of maximum femur length of the Pompeian sample. Graph: Estelle Lazer

cause of pathological change to bones after degenerative changes.³³ Only one case presented with an injury that was consistent with having occurred at or around the time of death. The fracture pattern suggested a perimortem blow to a skull, which may reflect a tephra-related injury. The frequency of healed or healing trauma in the entire bone sample that could be identified from gross inspection was about 0.6 per cent (Figures 5.4 and 5.5). If an additional eleven observed cases of osteophytic change to the distal articular surface of the femur could be demonstrated to have resulted from trauma, the percentage would rise to 1.2 per cent. The rate of observed trauma in the radius and ulna was 0.5 per cent. For the tibia and fibula it was also 0.5 per cent, while it was 0.8 per cent for the femur. If an additional eleven equivocal cases were added, the frequency for trauma to the femur would rise to 3 per cent.³⁴

Bisel documented the cases of trauma that she observed in the Herculaneum sample that was available to her, though she did not distinguish between fractures, dislocations, and inflammatory responses. This makes it difficult to compare her results with the Pompeian data. She reported that 32 per cent of

³³ Steinbock (1976: 17); Brothwell (1981: 119–20); Ortner and Putschar (1981: 55); White (2000: 383–4); White and Folkens (2005: 312).

³⁴ Lazer (1996; 1997: 110; 2007: 610; 2009: 194).



Figure 5.4 Healed fracture of a right femur with associated osteomyelitic lesions in the form of sinuses on the bone surface. These lesions reflect a secondary infection that has healed. Photo: Estelle Lazer.

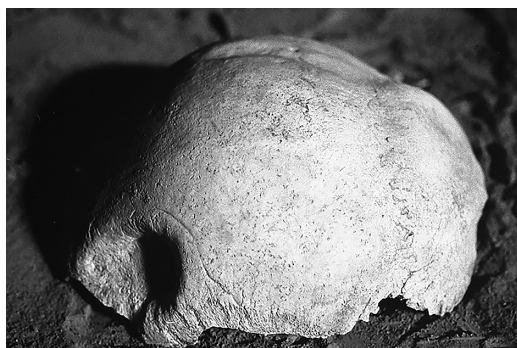


Figure 5.5 Healed depressed fracture of a skull, which involved the left parietal bone. Photo: Estelle Lazer.

the male sample and 11.4 per cent of the female sample displayed evidence of trauma, with a population average of 22.7 per cent. She did not consider that these figures indicated bias towards injury in the Herculaneum sample.³⁵ Capasso recorded cases of fractures separately from evidence of other types of trauma. He reported thirty-one fractures in seventeen of the 162 individuals that he studied, which is 10.5 per cent of the sample. Like Bisel, he found the majority of cases involved males, with a ratio of 4.7:1. He attributed the higher

³⁵ Bisel (1987: 124–5). Cf., for earlier studies, Bisel (1983; 1986).

incidence of fractures in males to gender-related division of labour. Four of the fractures involved the frontal bone of the skull, one the temporal bone, one the nasal region, and one the mandible. There were three fractures of the radius, four of the ulna, one of the humerus, and one of the femur.³⁶

It would be misleading to compare the Pompeian figures for the frequency of fractures with those obtained from other archaeological sites and modern populations, as many of these studies would have utilized X-ray technology and, in the case of modern living populations, there is the advantage that the entire skeleton is available for investigation. The frequency of observed trauma in the Pompeian skeletal collection is low, which indicates no apparent bias towards infirmity. The cases of healed trauma in the Pompeian sample are testament to the robust immune systems of these individuals.

Porotic Hyperostosis

Porotic hyperostosis refers to porosity of the cranial vault and/or orbits. It is usually related to the resorption of the underlying cortical bone. This results in thinning and can lead to the complete destruction of the outer table of the cranial vault. These changes, which are also described as *cribra orbitalia* when they present as a collection of small apertures or pitting on the orbital roof, are considered more likely to occur during childhood. It has been argued that active lesions are only found in individuals between the ages of 6 months and 12 years of age. It should be noted that the relationship between porotic hyperostosis and *cribra orbitalia* has been questioned by some scholars and it has been proposed that they may not simply be different manifestations of the same process.³⁷

Though the exact cause for these bony changes has not been isolated, they have often been associated with nutritional deficiencies. It is suspected that porotic hyperostosis is related to anaemia, possibly iron deficiency anaemia, though it has also been suggested that it may be associated with high parasite loads. Nutrient losses due to diseases that cause diarrhoea have also been cited as a possible cause. It should be noted, however, that some scholars doubt that there is sufficient evidence to establish the association between these skeletal changes and any specific disorder.³⁸

³⁶ Capasso (2001: 998–1002). It should be noted that Capasso had access to X-ray technology for his study.

³⁷ Steinbock (1976: 239); Brothwell (1981: 165); Ortner and Putschar (1981: 258–63); Shipman, Walker, and Bichell (1985: 299); Stuart-Macadam (1985: 391–8); Molleson (1987: 145); Martin et al. (1991: 149); Stuart-Macadam (1991: 36–9); Mittler and Van Gerven (1994: 287–8); Rothschild (2002: 417); Rothschild et al. (2004: 4–7); White and Folkens (2005: 320–2); White, Black, and Folkens (2012: 448–50).

³⁸ For example Waldron (2009: 136–7).

One hundred and thirty adult and adolescent skulls were complete enough for assessment for evidence of porotic hyperostosis. No significant lesions were observed on the cranial vault. Some degree of pitting, or cribra orbitalia, was observed on the orbital roofs of 90 per cent of the skulls. Most of the cases (about 59 per cent) displayed minimal but unequivocal porosity, which could be seen with the naked eye. A number of cases (about 28 per cent) were more equivocal, with barely discernible pits, which could only really be seen with the aid of a hand lens. Only about 3 per cent of the sample exhibited a medium degree of expression with coalescing pores, there was no evidence at all of cribra orbitalia on about 7 per cent of the sample, and approximately 3 per cent of the orbits in this sample were too incomplete to assess. All the cases exhibited lesions that could be described as 'healing', which is consistent with an interpretation of incomplete remodelling of the bone after an episode of illness a considerable time prior to death. It is difficult to assess the pathological importance of such slight bony changes, though it is notable that they occur with a high frequency.³⁹ The presence of these healing lesions suggests successful adaptation to an environment and the workings of healthy immune systems.

Interestingly, Bisel did not record cribra orbitalia for the Herculaneum victims but did observe evidence of porotic hyperostosis on cranial vaults of the sample she studied. She interpreted such porotic changes as slight, healed anaemia. She considered that it was fairly common in the Herculaneum sample, with an overall frequency of 34.1 per cent ($n = 98$).⁴⁰ Unlike Bisel, Capasso recorded twelve cases of cribra orbitalia, along with twelve cases of porotic hyperostosis involving the vaults of the skulls of the Herculaneum sample he studied. Sixteen of these victims were male and seven were identified as female. The frequency of porotic hyperostosis reported by Capasso is about 7.5 per cent, which is considerably lower than that diagnosed by Bisel. In the light of the suggestion that they are different conditions, it is notable that there was only one individual that presented with both disorders.⁴¹

Osteophytic Change

Osteophytic changes are bony changes, such as lipping that can be observed on the articular surfaces of bones. They are associated with bone proliferation, most commonly around the joint margin. Contributory factors include various diseases, diet, trauma, and advancing age. The two most common types of

³⁹ Lazer (2009: 198).

⁴⁰ Bisel (1988a: 62, 64; 1988b: 213; 1991: 14); Bisel and Bisel (2002: 458).

⁴¹ Capasso (2001: 1012–15, 1055).

arthropathies or degenerative diseases linked with osteophytic change are osteophytosis of the spinal column and osteoarthritis of the synovial joints. Osteophytosis involves growth of bone from the margins of the vertebral bodies. Osteoarthritis is non-inflammatory and characterized by bony lipping and spur formation in response to the destruction of the articular cartilage of a joint. These changes are most commonly observed in load-bearing joints, most notably the knees, hips, and spine.⁴²

In view of the difficulty of establishing the cause and kind of osteophytic change from disarticulated skeletal material, I concentrated on the identification of specific arthropathies that could be diagnosed from a minimal number of bones from one individual. The main interest in the identification of arthropathy was to determine what effect it may have had on the ability of individuals to escape and whether there was evidence of any age-related arthropathy that might provide some insight into the Pompeian lifespan. Virtually every different type of articular surface was represented by at least a few examples of osteophytic change of varying degree. The degree of osteophytic change was routinely recorded, using a four-point scale.⁴³

The only arthropathy that presented in the sample that could be unequivocally identified from disarticulated material was diffuse idiopathic skeletal hyperostosis, also known as DISH or Forestier's disease. This is because it has a distinctive morphological appearance (Figure 5.6). DISH is characterized by ossification of the anterior longitudinal ligament, particularly along the right anterolateral aspect of the thoracic vertebrae. This ossification is continuous and has been described as resembling dripping candle wax. It generally affects the thoracic vertebrae. It is usually only diagnosed as present when at least four contiguous vertebrae are fused. The cause of this disorder is unknown but there does appear to be some association with obesity, especially in early life, and diabetes. It occurs more frequently in males and there is a strong correlation between advancing age and the presence of DISH. It is unlikely to be observed in individuals in modern populations who are under 50 years of age.⁴⁴

Two likely cases of DISH were observed in the Pompeian collection. With the exception of these cases, it is difficult to assess the osteophytic change observed in this sample.⁴⁵ Some cases probably do reflect age-related osteoarthritis, though consideration must also be given to the possibility that some

⁴² Brothwell (1981: 146); Manchester (1983: 65–70); Rogers et al. (1987: 179–93); Roberts and Manchester (1995: 105–6).

⁴³ Lazer (2009: 200).

⁴⁴ Arriaza, Merbs, and Rothschild (1993, 243–8); Aufderheide and Rodríguez-Martin (1998: 97–8); Cammisa, De Serio, and Guglielmi (1998: 7); Kiss, Szilágyi, et al. (2002: 27–30); Kiss, O'Neill, et al. (2002: 226–9); Ortner (2003: 558–9); Roberts and Manchester (1995: 120–1); Rogers et al. (1987: 186–8); Weinfeld et al. (1997: 222–5); White, Black, and Folken (2012: 443).

⁴⁵ Lazer (2009: 201–2).



Figure 5.6 An apparent case of DISH observed on adjacent thoracic vertebrae. Photo: Estelle Lazer.

result from trauma or occupational stress. It has been suggested that there is a tendency for individuals to develop premature degenerative joint disease in complex communities which feature specialization in craft and trade, as a result of excessive strain from intensive and repetitive activities.

The presence of DISH is merely indicative that there were individuals who survived into older adulthood. It has been asserted that DISH is not a disease but a reflection of the ageing process. It is not considered to be a true arthropathy because it does not involve the cartilage or the synovium. It appears to result more from excessive bone production at joint margins. Despite its appearance, it is not particularly debilitating. This is because it tends to involve the thoracic vertebrae, so anterior flexion, which is mostly produced by the lumbar segment, is largely unaffected.⁴⁶

Bisel recorded a slight to moderate degree of vertebral arthritis in 47.5 per cent of the males in the Herculaneum sample and 36.4 per cent of the females.⁴⁷ Capasso also reported high rates of osteophytic change to the vertebral columns of the victims in his sample. He diagnosed five cases of DISH, all in male skeletons.⁴⁸

⁴⁶ Aufderheide and Rodríguez-Martin (1998: 98); Arriaza, Merbs, and Rothschild (1993: 243–4); Ortner (2003: 558–9); Rogers et al. (1987: 187).

⁴⁷ Bisel (1988a: 63–4; 1988b: 212; 1991: 14); Bisel and Bisel (2002: 468–9).

⁴⁸ Capasso (2001: 1018–31).

Hyperostosis Frontalis Interna

The discovery of bilaterally symmetrical deposits of bone overgrowth on the inner table of the frontal bone of a skull in the Pompeian sample led to the investigation of the available crania for evidence of hyperostotic change. These bony growths have been diagnosed as HFI, a disorder generally associated with post-menopausal women. It has been demonstrated that the rate of occurrence, though not the type of HFI, is strongly correlated with age.⁴⁹ General consensus in the more recent literature indicates that HFI is a benign clinical condition that is unrelated to other bone disease.⁵⁰ Since HFI only involves the skull, the disarticulated nature of the sample does not have a significant effect on the confidence of diagnosis.

Forty-three of 360 adult skulls that were examined displayed bone thickening or hyperostotic changes consistent with a diagnosis of HFI (Figure 5.7).⁵¹ The frequency of HFI in the total population of modern Western societies has been reported as between 5 and 12 per cent, with the majority of cases being observed in older females.⁵² The observed frequency of HFI in the 360 Pompeian skulls that were examined is 11.9 per cent, which is in the upper end of the range for the incidence cited by the literature of this disorder in modern populations. It should be noted that the reported frequency of HFI in modern populations is probably an underestimate as it is generally subclinical and is often only incidentally reported. Some scholars suggest that it could be as high as 15 per cent.⁵³ Since the presence of HFI in the Pompeian skeletal record is consistent with its apparent incidence in a modern population, it appears more likely to be a reflection of the frequency of its occurrence in the Pompeian sample than a major contributing factor to the demise of individuals when Mount Vesuvius erupted. This suggests that the total Pompeian skeletal sample of victims is representative of a normally distributed population with no bias towards pathology. Given the large number of cases identified in

⁴⁹ Nikolić et al. (2010: 205–7).

⁵⁰ She and Szakacs (2004: 206–8). For a considerable period of time this disorder was described as a syndrome with a suite of signs and symptoms, including obesity, hirsutism, non-insulin dependent diabetes, and headaches. For some of the earlier literature on this condition, see HersHKovitz et al. (1999: 303–10); Ortner and Putschar (1981: 294); Ortner (2003: 416); Cocheton, Fineltain, and Poulet (1974: 2946); Salmi et al. (1962: 1032); Stewart (1928: 321).

⁵¹ For the methods used in this study, see Lazer (1995: 244–9; 1996: 620–3; 1997: 110–11; 2007: 610).

⁵² She and Szakacs (2004: 206–8).

⁵³ The frequency of HFI in modern European populations is based on a number of studies. The most commonly cited was based on unselected samples in hospitals. The frequency of HFI in the Pompeii sample, at between 11.1 per cent and 11.9 per cent, is consistent with this range. The lower figure is reached if equivocal cases are excluded: Moore (1955); Salmi et al. (1962: 1039); Taveras and Wood (1976: 175–8); Armelagos and Chrisman (1988: 27); She and Szakacs (2004: 206–8); Talarico, Prather, and Hardt (2008: 266).

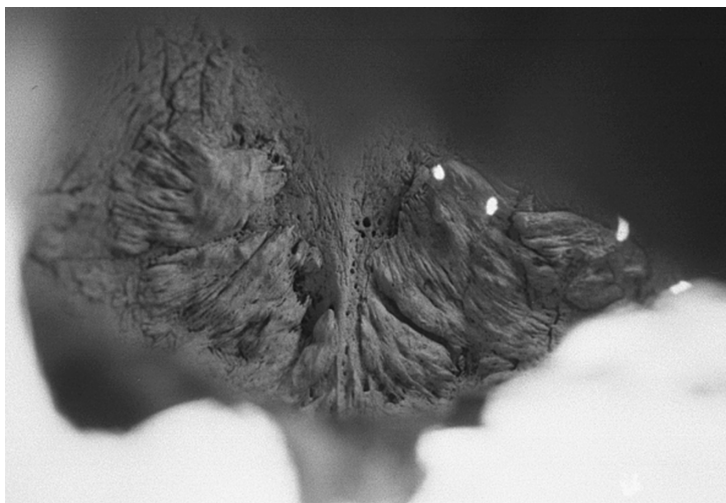


Figure 5.7 View through the foramen magnum of a skull displaying extensive HFI. Photo: Estelle Lazer.

the Pompeian sample, it is surprising that only one possible case of HFI has been reported from the Herculaneum sample that has been studied. Capasso mentions that two out of 162 individuals he studied presented with hyperostotic changes to the skull, but only one of these conforms to a possible diagnosis of HFI. He noted that there was evidence of hyperostotic change in the skull of an older female that was consistent with a hormonal disturbance that is typical of menopause. He estimated that this individual was about 50 to 55 years of age when she died. Unfortunately, he did not describe the pathology in great detail and did not refer to standard sources for classification, so assessment of his diagnosis is problematic.⁵⁴

It is extremely difficult to account for such a significant difference in the frequency of HFI reported in the Pompeian and Herculaneum samples. It is possible that these two samples are quite distinct and not interchangeable, even though they were contemporary, geographically close, and comprised of victims who all died as a result of the same event. It could be possible that Capasso, whose study included radiographic analysis of each skull, may not have observed HFI, especially if it were mild. It has been noted that HFI can be difficult to detect on X-rays.⁵⁵ It would certainly be worthwhile reinvestigating the Herculaneum crania with direct observations on the bone to ascertain whether the frequency of HFI really is so low.

⁵⁴ Lazer (2009: 203–13).

⁵⁵ HersHKovitz et al. (1999: 320–1).

DISCUSSION AND CONCLUSIONS

There are many disorders that do not present on bone. The skeletal evidence, however, provides some insight into the general health of the Pompeian victims. Based on femur length, the stature of the Pompeians is consistent with that of other Roman populations in Italy. This appears to have been lower than that of the preceding and subsequent Italian populations and may reflect some stress during the growing years. The dental data suggest that there may have been some underlying health problems. The poor state of oral hygiene in many mouths possibly provides indirect evidence for systemic infections or more serious soft tissue pathology. The number of healed and healing injuries, however, reflects a certain robusticity in the immune systems of the victims.

Scholars with preconceived ideas about ancient lifespan recreate a past that reinforces their view of antiquity. Average lifespans are usually based on life tables, which provide mean ages at death and are always depressed by the high rate of infant mortality. It should be noted that life tables were initially devised in the seventeenth century by Edmund Halley for the purpose of computing annuities for life insurance. The data were relatively accurate as the original models were derived from known populations. Life tables have since been applied to archaeological material to provide overall population profiles. Modern models are used but the level of accuracy decreases when extrapolated onto ancient populations due to the number of assumptions that must be drawn.⁵⁶ Scheidel, among others, has recognized problems associated with the use of life tables, such as the inflation of infant mortality relative to that of adults as a result of the algorithm employed for standard model life tables. Nonetheless, he argues that, with certain caveats, they can still be useful.⁵⁷

One of the key problems with palaeodemography and the use of life tables is that it is difficult to determine adult age at death from bones.⁵⁸ The available techniques tend to underage skeletons of mature people. This makes the discovery of a significant number of cases of HFI of particular importance. The presence of age-related disorders, such as HFI and DISH, suggests that individuals were surviving into old age. This challenges the view that is often presented by scholars, including physical anthropologists, that ancient people were shorter-lived than their modern counterparts.⁵⁹ Moreover, the frequency of the occurrence of HFI in the sample is comparable to that in a modern Western population. This indicates that the sample was not only random and

⁵⁶ Wood et al. (2002); Cohen (2005: 47–8); Lazer (2009: 157–8); White, Black, and Folkens (2012: 485–8); Scheidel (2012: 321–4).

⁵⁷ Scheidel and Sutherland (2010: 4); Scheidel (2007b: 38–41; 2012: 322).

⁵⁸ See, for example, Scheidel and Sutherland (2010: 5); White, Black, and Folkens (2012: 485–8).

⁵⁹ Such as by Scobie (1986: 399); Henneberg and Henneberg (2002: 185).

normally distributed but also that the Pompeian lifespan was potentially equivalent to that of individuals in a modern Western population. This does not contradict the evidence for high infant mortality in the Roman world that has been derived from historical and archaeological sources. The adult victims that were preserved in the volcanic debris reflect those individuals that not only survived the first few critical years of life but also lived long enough to succumb to older-age-related disorders.

It would have been preferable if the Pompeian skeletal sample had not been disarticulated, with the resultant loss of information. The identification of various disorders, such as brucellosis and tuberculosis in the Herculaneum sample, highlights this, as entire skeletons are required for diagnosis. Nevertheless, the compromised Pompeian sample not only yielded results that corroborated a number of the findings from Herculaneum, but also provided evidence of the presence of disorders not reported in the Herculaneum sample, most notably the substantial number of cases of HFI. Re-examination of the Herculaneum skulls may change this.⁶⁰

Some of these conclusions may appear to be at odds with those of scholars like Jongman and Scheidel, who have argued that people in the Roman era, especially those who lived in densely occupied urban environments, suffered high and unpredictable levels of mortality.⁶¹ The victims of a mass disaster do not yield the same type of evidence as that provided by skeletons from a cemetery context. Interpretation of skeletal evidence is not straightforward and the bones of the Pompeian victims show signs of both insult and recovery. It is important to realize that the Pompeian skeletal sample is a reflection of a living population, and while morbidity and mortality may have been high in the Roman period, the people who survived to become victims of the AD 79 eruption appeared to have robust immune systems and a significant number appeared to be living well into old age.

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⁶⁰ I have recently commenced a project to X-ray and, if new techniques can be developed, CT scan, the casts of the human victims. As these contain articulated skeletons, it will be possible to diagnose a much greater range of pathology and build on the corpus of information that has already been obtained.

⁶¹ For example, Scheidel (2001: 1–26; 2003: 158; 176; 2007a: 6); Jongman (2003: 118–19).

rethink my interpretation of the Pompeian sample. Special thanks go to Associate Professor Kathryn Welch, University of Sydney, for her comments, criticism, and assistance with the text. The author, of course, takes full responsibility for the views and possible errors in this chapter.

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Part III

Economic Life and its Contexts

Measuring the Movement Economy

A Network Analysis of Pompeii

Eric Poehler

Even if our own approach to things is necessarily conditioned by the view that things have no meanings apart from those that human transactions, attributions, and motivations endow them with, the anthropological problem is that this formal truth does not illuminate the concrete, historical circulation of things. For that we have to follow the things themselves, for their meanings are inscribed in their forms, their uses, their trajectories. It is only through analysis of these trajectories that we can interpret the human transactions and calculations that enliven things. Thus, even though from a *theoretical* point of view human actors encode things with significance, from a *methodological* point of view it is the things-in-motion that illuminate their human and social context.¹

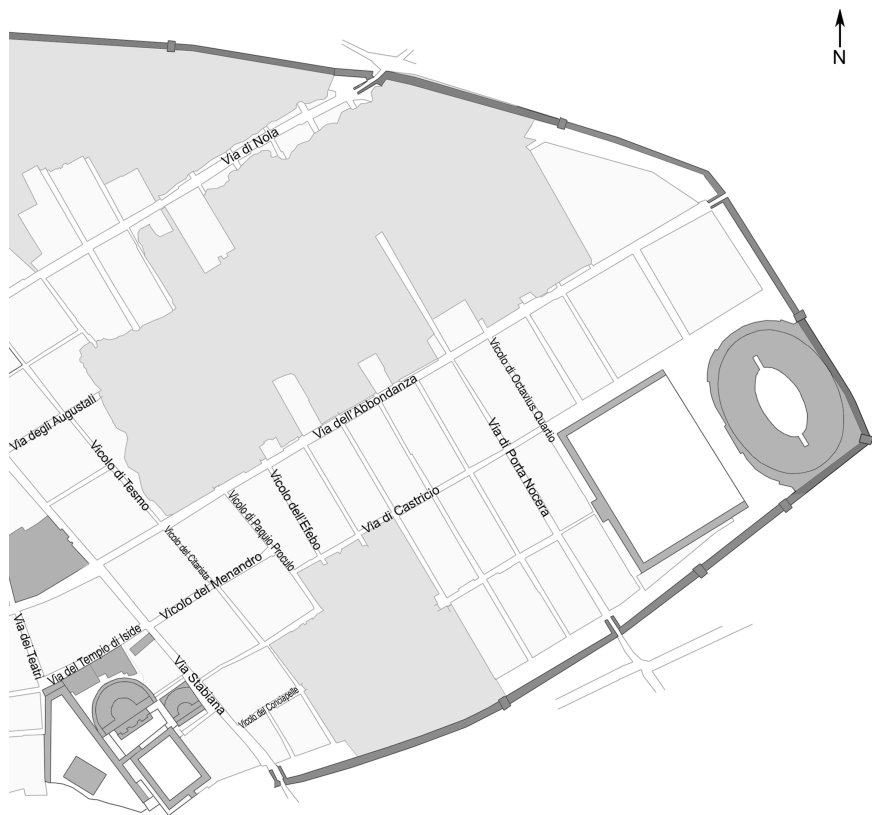
For a long time I have been enamoured of this quotation from Arjun Appadurai's *The Social Life of Things*. In this passage, Appadurai first succinctly articulates and embraces the broader modern notions of meaning-making before denying such theories the power to say anything meaningful about specific objects. At the heart of Appadurai's argument (a part of a larger argument for commodity theory) is the metaphor of economic exchange—that in the moment of exchange an object's value is temporarily reified and becomes observable. In transposing the word 'value' with 'meaning', commodity theory shifts from a tool for examining economic exchange, to a tool for examining social transactions, including deeply socialized economic behaviours.

For just as long, however, I have been challenged by its implications for the field of classical archaeology. It is easy to imagine the great volumes of materials flowing through the streets of Pompeii, and ancient literature helps to add detail to that picture. But how do we answer Appadurai's challenge and

¹ Appadurai (1986: 5).



Figure 6.1 Pompeian street names.



say anything specific, anything meaningful, about that circulation of material? We must follow the objects in motion, as he says, but the archaeological record is both static and incomplete. What objects we have exist only at their final destination, with rare evidence for their origins and even rarer information on the moment of their exchange. How then, if we cannot work at the level of specificity of the object, can the methodological implications of commodity theory meaningfully be deployed at Pompeii? The way forward may well be to step back to a more general level; to model movement as a wider flow and to compare it with a broader category of objects. To use an analogy: if we cannot observe fish in migration, perhaps we can use the volume, speed, and direction of the ocean currents that carry them as a proxy. The purpose of this chapter is to explore ways to measure that current in the context of a particular Roman city, first by examining previous attempts at modelling movement in Pompeii, then by suggesting a new model of movement—one of many that might be built—and considering what utility it has for understanding the city's socio-economic landscape.

I will address the final point first, the utility of the model. At its most basic, the purpose of building such a model is to offer a new abstraction of the city to compare with other such abstractions. Consider, for example the famous (or infamous) map by Eschebach of Pompeian property types.² Constructed from the identification of property function, and despite its faults, this map is often the first place Pompeianists turn to examine the abstract categories of Pompeii's social texture, especially its economic landscape. We are also familiar with the standard formulas of how abstractions such as property types are further used to explore the urban environment. Andrew Wallace-Hadrill's work on residential properties provides one of the best examples.³ An elite house can be defined by being more than a certain number of square metres in area and containing an atrium and/or a peristyle. These elements provide a metric by which to compare one house with other houses and justify terming such properties as 'elite' houses. Similarly, Steven Ellis' definition of a property as a bar by the existence of a masonry counter, its limited size, and its wide door defines another category of space.⁴ Brothels, most confidently identified by the presence of masonry beds in cramped *cellae*, are a third example.⁵ In this act of definition, spaces are (temporarily) reified into abstractions—'elite house', the 'bar', and 'brothel'—that can then be plugged into formulas. The operands of these formulas, most often distance (e.g. how far an elite house is from a bar or brothel) create a relationship between the property types in

² Eschebach's colour-coded map is based on the identifications in Eschebach (1970) and the later elaborations in Eschebach, Eschebach, and Müller-Trollius (1993).

³ Wallace-Hadrill (1994: 81–7); see also Robinson (1997).

⁴ Ellis (2004: 373–5; 2005: 43–62).

⁵ McGinn (2002).

order to find social rules and norms in the output. Building a model of movement in Pompeii produces yet another abstraction to combine with residential and entertainment variables, among others.

More specifically, accurately modelling movement is a step closer to defining some of the economic principles underlying the shape of space in the city. Recent scholarship has fully dismissed Maiuri's long distrusted image of Pompeii as a city in decline following the great earthquake of AD 62/3.⁶ Elites did not flee the city at this time, leaving it to freedmen and the lower classes to invade their former homes and transform them to vulgar commerce. Archaeological research on *fullonicae* has shown that these businesses were deliberately inserted into atrium-style residences prior to the great earthquake, co-opting the space of the *salutatio* for a different clientele.⁷ More specifically, excavation within *tabernae* has revealed a consistent sequence and chronology for the shift in the investment strategy of property owners during the Augustan age from household-level fish-processing industry to retail sale of food and drink.⁸ In this new image of the Pompeian economy of the imperial period, elites and non-elites invested in urban property and commerce, adjusting their investment in both to respond to the dwindling of one market and the opening of another, flipping an axis of the urban economy, at least as seen through the lens of property investment, from industry to service. The creation of these bars and their architectural formats demonstrate that, in the first century AD, there was money to be made through high-volume, low-price transactions if one could entice the passer-by to stop and spend some of the small denomination coins from his/her pockets.

From a theoretical perspective, the preceding archaeological interpretation relies on a rather broad and broadly shared underlying principle: that there is a correlation between the number of people moving through a particular area and the economic potential for that area. This is most succinctly put in the real estate mantra 'location, location, location'. The idea is not new, but it is now fashionable to use Bill Hillier's more specific term 'movement economy'. Hillier defines the movement economy as:

[T]he reciprocal effects of space and movement on each other [...], and the multiplier effects on both that arise from patterns of land use and building densities, which are themselves influenced by the space-movement relation, that give cities their characteristic structures...⁹

⁶ The most recent challenges to Maiuri's (1942) model have offered a more nuanced model of what was occurring in both residences (Anderson [2011]) and in production spaces (e.g. Kastenmeier [2007] and at Herculaneum, Monteix [2010]) in the final decades of Pompeii's existence. Wallace-Hadrill's (1994: 122–31) critique of Maiuri is still a worthy starting point.

⁷ Flohr (2011; 2012).

⁸ Ellis (2011b, 76–83); Chapter 10 (this volume).

⁹ Hillier (1996: 113–14).

Like Appadurai's quotation, Hillier's statement is broad and it is hard to operationalize the theory it expresses. Moreover, the reciprocal relationship between space and movement makes it difficult to separate cause and effect. That these forces have 'multiplier effects', however, does suggest that we can at least identify areas of greatest or least intensity, where movement and spatial development, particular of an economic variety, combine most clearly to shape the city.

On the space side of the equation, a great deal of work has been done to improve the ever- and over-relied upon Eschbach map of property types. Some of the best work has been done by the contributors to this volume.¹⁰ Pompeian scholars have also made a number of arguments about the reaction of space to movement, largely from the point of view of space, that is, from the inside the building looking out to the street.¹¹ The identification of purpose-built commercial complexes has been a particularly fruitful area of interest.¹² On the movement side of the equation, however, progress has been limited and, in my opinion, largely unsuccessful. To realize the potential of the movement economy theory (and the metaphor of commodity theory), we must balance this equation and build a more robust method to model movement.

CRITIQUE OF PREVIOUS APPROACHES

In the early 1990s, Pompeian studies were revolutionized by the advent of quantitative and spatial approaches towards the ancient city. Though now thoroughly critiqued, Ray Laurence's seminal metric of counting the number of doorways along a street and dividing the length of that street by the number of doorways remains one of the most commonly deployed means to measure the intensity of the use of space along the street frontages.¹³ To express these data, Laurence divided the city streets into four categories—streets with doorways every 0–5 m, 6–10 m, 11–15 m, and streets with over 15 m between doorways on average—and produced a map for each category (Figure 6.2).¹⁴

¹⁰ For example, Ellis (2004; 2005); Flohr (2007; 2011); Monteix et al. (2008; 2010; 2011, 2013, 2014); Robinson (1997; 1999). See also Kastenmeier (2007).

¹¹ Ellis (2004); Poehler (2011); Craver (2010: 108–12).

¹² Jones and Robinson (2005); Laurence (1994: 105–7); Pirson (1997; 1999).

¹³ Laurence 1994, 89–91. Negative reviews include: George (1995); Small (1996); Ulrich (1997). In my own opinion, the quality of *Space and Society* is equivalent to its problems—it advanced the methodological toolkit significantly even if some the results were overinterpreted. It is awash in the most idiomatic of senses—it is equal parts baby and bath water. I believe history will be kinder to *Space and Society* than contemporary reviews were. Indeed, the reviews of a much reworked second edition are more favourable: McIntosh (2007); Viitanen (2007); Zajac (2011).

¹⁴ Laurence (1994: 92–3, maps 6.1–6.4).

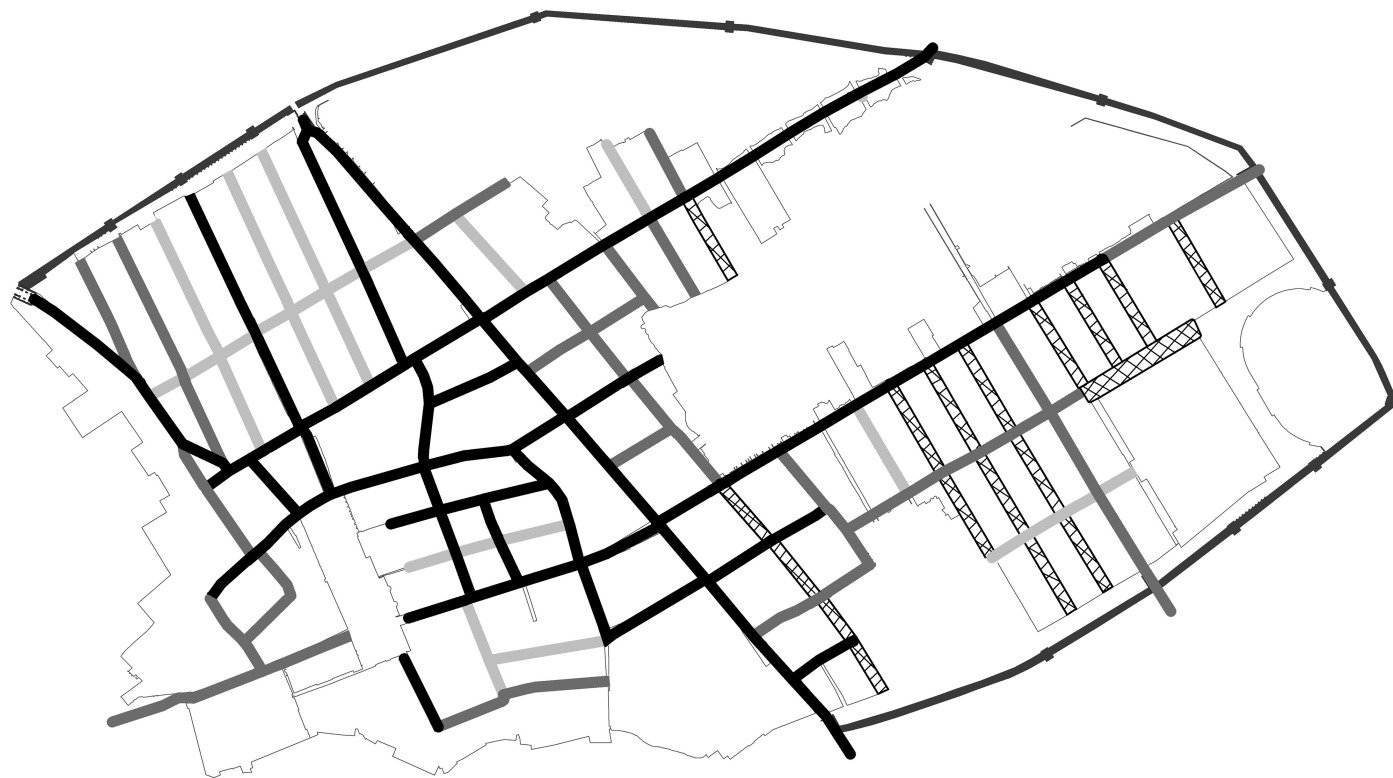


Figure 6.2 Occurrences of doorways at Pompeii. After Laurence (1994: maps 6.1–4). Doorways 0–5 m, black; doorways, 6–10 m, dark grey; doorways 11–15 m, light grey; doorways 15+ m, cross-hatching.

These four maps (here combined into one) offered the first quantified expression of the variability of human movement in the city and, for two decades, Laurence's 'occurrence of doorways' method (hereafter, ODM) has rightly been one of the premier abstractions describing potential movement in Pompeii.

There have been, however, many critiques of Laurence's book in general and with this method specifically. Two issues are relevant to this discussion: (i) the method's general lack of sensitivity to nuance in the dataset of doorways and (ii) the lack of continuity among those data. The first problem with the ODM approach—its lack of sensitivity—is created by the manner in which the data were calculated and expressed, precluding finer-grained interpretation. For example, because the doorway counts from both façades of a street were combined and averaged, the unique histories of each block facing a street are obscured. This mode of calculation obscures the evidence for the movement of people and skews the results in the maps, which are the only data available to the reader. In fact, the maps themselves amplify this problem by dividing the doorway occurrences into only four groups, carving out categories too broad to find the more detailed patterns in the data.¹⁵

Interestingly, in a single paragraph, Laurence inadvertently highlights both problems of sensitivity (place) and continuity (path) in his method.¹⁶ Two streets leading to gates, Via Marina and Via del Vesuvio (for the location of these streets see Figure 6.1), have doorway spacings between 3.1 m and 5.9 m, placing them in the first division of doorway occurrences, but into the second subset of that division. Laurence argues that mitigating factors skew the data on these two streets and they should be considered as part of the first subset (2.0–3.0 m) along with the other streets connecting to the forum and the major through-routes. On Via Marina, there are only two doors on the south side of the street, while the north side has twenty. The two southern doors, however, open onto the Basilica and the Sanctuary of Venus, two of the largest and most important destinations in all of Pompeii. Laurence rightly reasons that these two doors would have attracted far more people than their number can represent. Embedded within this interpretation, however, is the criticism that the quantification of doors masks the quality of the place that door leads to: place matters.¹⁷

Similarly, the lower-than-expected doorway density of Via del Vesuvio, despite its connection to both the Porta del Vesuvio and one of the most important crossroads in the city, is a pattern to be explained by the special

¹⁵ For example, Vicolo di Eumachia is placed in the highest category and Vicolo del Labirinto is placed in the third highest category, despite entire blocks of each street having no doors at all. Other streets with no doors, such as the street between Insula I 1 and Insula I 5, are ignored entirely in the mapped data.

¹⁶ Laurence (1994: 91).

¹⁷ Laurence (1994: 101–3) attempts to address this issue in a related analysis, breaking doorways into two types to represent shops (wide doors) and domestic space (narrow doors).

circumstances in the area. Because Vicolo dei Vettii flanks Via del Vesuvio and also connects to the Porta del Vesuvio (if indirectly), Laurence again rightly concludes that the lower density of doorways on Via del Vesuvio is a function of the bifurcation of traffic entering and leaving the city. On this basis, Laurence moved Via del Vesuvio into his highest density category to reflect more accurately the movement potential of this street. Explaining the historical factors affecting these data, however, reveals another weakness of the method. Counting doorways on a street segment can only model the activity *within* that segment and cannot consider the impact these doorways could have on the activity levels of adjacent street segments and vice versa. Movement is thus unrealistically bound to the unit of analysis, ignoring the paths Pompeians took across the city, both in moving to these doors and moving past them. As the following discussion will demonstrate, paths matter.

Several years ago I attempted to revise Laurence's ODM in order to understand the impact of wheeled transport in the city.¹⁸ The first step was to shift the unit of analysis from the street to the individual insula façade and recalculate the number of doorways by the length of that façade. In addition to giving each side of the street its own history, this change also detached the doorway data from the street as a unit defined in length by the names given by excavators (Figure 6.3).¹⁹ The second modification of Laurence's method was to divide the doorway data into ten categories rather than only four. The result of these adjustments is an instrument more sensitive to the fluctuations in the urban social and economic landscape, capable of illustrating the various impacts of different places and even the variable impact of a specific place. That is, the map used to express these ten categories of doorway densities can be used not only to compare very specific locations with one another, but also can show the differential effect of an individual building, such as the 'pockets' of low doorway densities on the façades of many monumental buildings and the higher incidence of doorways on the façades facing those monumental buildings.

I have felt it necessary to include my own modifications to Laurence's method here, not only because they are an attempt to improve the sensitivity of the doorway occurrences model to more localized variability within the data, but also because it is necessary to admit that my own previous attempts to use doorways to define movement in Pompeii are equally inadequate to address the second and greater problem: the lack of connectivity (path) within the data. It is also necessary because Laurence's choice to have particularly long street segments does a better job of masking the issue. My maps, however, reveal this failing rather starkly. Consider the frontage of the Casa del Fauno

¹⁸ Poehler (2009: 276–9).

¹⁹ Although Laurence did subdivide the longer streets, his unit of analysis still varied from one block in length to as many as seven (in the case of Via di Castricio).



Figure 6.3 Occurrences of doorways at Pompeii. After Poehler (2009: maps 6.23–7).

on Via della Fortuna (Figure 6.4). The six doorways along the 32.45 m façade length places it into my third category of density (very high), at 5.41 m of façade per doorway. Across the street, the roughly equivalent section of insula VII 4, has an approximately equivalent density (5.76 m/doorway). In several of the street sections to the east and west of the Casa del Fauno, however, the densities of doorways are appreciably higher (in this case, producing a lower number of metres per doorway). If doorway density along a street is a proxy for movement density within that street, then how do we understand this drop in density in the middle of a major thoroughfare in terms of movement?²⁰ Since the connecting streets at this location—Vicolo del Fauno and Vicolo del Labirinto—show the lowest density of doors or no doorways at all, these streets offered little to pull people away from Via della Fortuna. Where then, did the people go? Did some of them simply turn around and go back upon reaching the Casa del Fauno? Being one of the largest atrium houses in the city, with two atria and two peristyles, it is commonly expected that this location would witness throngs of clients, slaves, delivery men, dinner guests, and others.²¹ Clearly, this is another example of the insensitivity of the ODM, in both Laurence's use and mine, to the importance of place. More importantly, this example demonstrates the method's inability to model the connectivity and interdependence among the data of adjacent street sections. To put it another way, each façade segment in my model or each street section in Laurence's has no way of showing how a higher or lower number of doorways further down the street might be influencing the number of people within a street at a given location or how it might therefore impact the number of doorways in those façades. Translating this into human experience, these methods treat people as if they teleport rather than transport themselves around the city.

An escape from this problem would seem to come from the space syntax method, an approach explicitly interested in the issue of spatial connectivity. Space syntax is a package of theoretical and practical tools designed to test the organizing effects of architectural designs on human actors without having to build the architecture or engage the human actors. In the context of large cities, analysis of street networks shows how these grids create the basic structure of urban movement and suggests how those patterns might be interpreted as the locations *along* the streets exploit the movement *within* the streets.²² Although space syntax techniques have been used regularly in the

²⁰ Note also that the number of tethering holes in the sidewalk also precipitously declines in front of the Casa del Fauno. See Weiss (2010: 368, figure 9).

²¹ Wallace-Hadrill (1994, 95). Cf. Chapter 2 (this volume).

²² The foundational publication on space syntax is still Hillier and Hanson (1984). See Hillier (1996: 111–37) for a more specific discussion of its socio-economic implications.

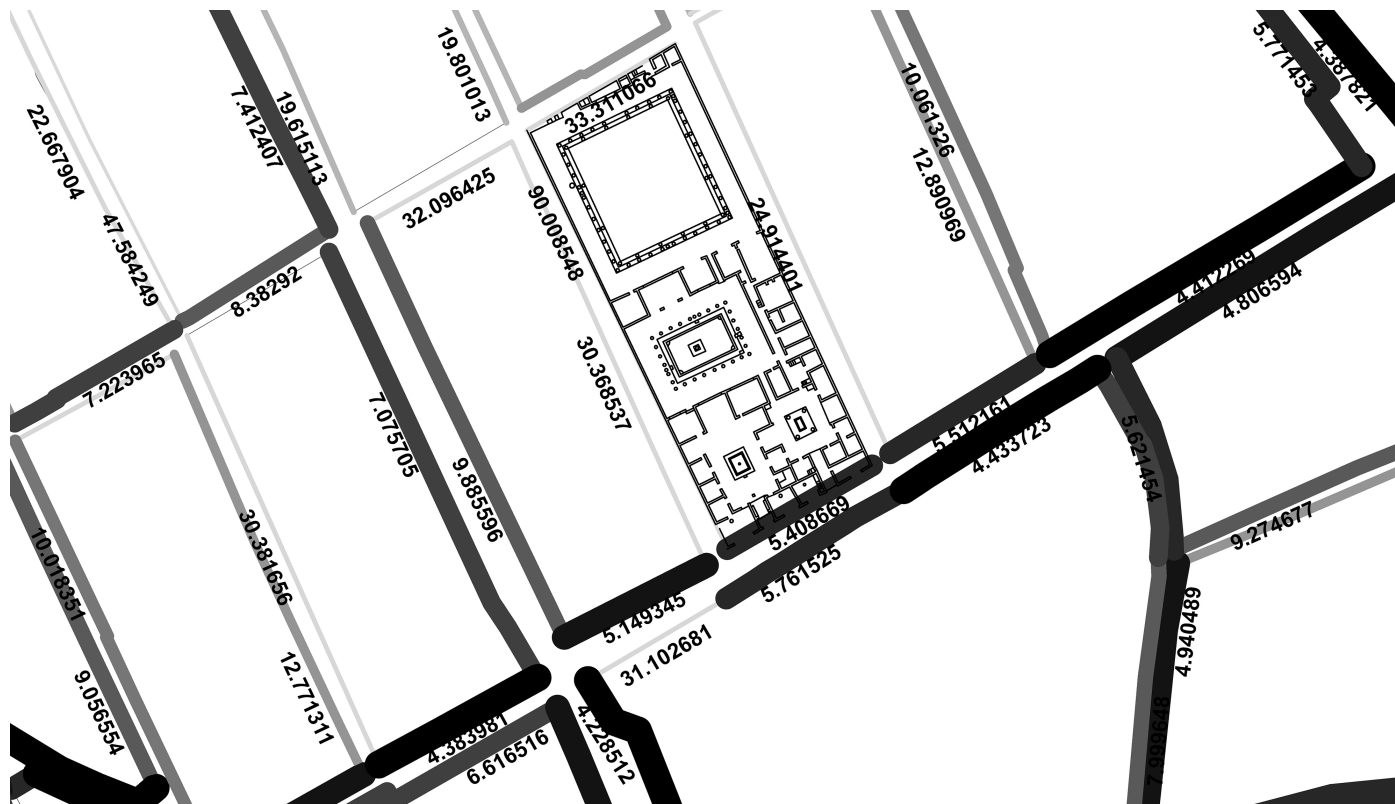


Figure 6.4 Occurrences of doorways at Pompeii, detail. After Poehler (2009: maps 6.23–7).

study of ancient buildings,²³ few researchers have published attempts to examine the entire city.²⁴ Recently, Alan Kaiser used the space syntax analysis called 'Depth' to explore the underlying spatial structure of Pompeii and to compare it to other Roman towns.²⁵ Depth is a measure of an individual street's level of connectivity, quantified as the number of other streets or plazas one must pass through from the edge of the city to reach that street. Thus, streets that lead to a gate have a Depth of 1 from the gates, while streets that intersect such a street have a Depth of 2 from the gates, and so on (see Figure 6.5).²⁶ To implement the Depth analysis, Kaiser divided the street network into segments based on the linearity of the streets rather than their length, ignoring any bend less than 45 degrees.²⁷ His units of analysis were therefore, in many cases, exceptionally long, which, when combined with the grid patterns across most of the city, meant that no street was topologically deeper than four steps from a gate. Kaiser also cleverly reversed the analysis, counting street Depth from the forum.²⁸

On their own, the results of such space syntax analysis are rather prosaic: the longest and widest streets connect directly to the city gates,²⁹ most of the city's streets cross these main streets (at a Depth of 2), and the most isolated streets are in the shadow of the forum. To be fair to Kaiser, these results were expected, indeed desired, and were intended as a kind of control group for two related projects: the consideration of Latin terms for urban streets and the examination of the kinds of properties that lined these streets.³⁰ It is the second project that is of interest here, as Kaiser made statistically relevant correlations between the locations of different categories of properties and the Depth of the streets onto which they open. In a series of tables, the account of property types—Commercial (i.e. retail), Health, Production, Residential, Administrative, Entertainment, and Religious—are given for the streets of each Depth category and compared against the number of such properties that would exist if their distribution across the Depth categories were completely random.³¹ While Kaiser's approach is to be lauded as an interesting and important attempt to bring together data from different analytical techniques into a single interpretive framework, the general results of this pairing of space syntax analysis of the streets and statistical examination of the

²³ Graham (1997; 2000); Fridell-Anter and Weilguni (2003); Anderson (2005; 2011); Stöger (2008). Laurence (1994: 115–21) and Newsome (2009), however, have attempted to connect their space syntax analyses to the adjacent streets, or to model a section of the city, respectively.

²⁴ Van Nes (2009; 2011); Weilguni (2011).

²⁵ Kaiser (2000; 2011a; 2011b). Newsome (2009) also used Depth.

²⁶ Kaiser (2011a: 53). ²⁷ Kaiser (2011a: 48).

²⁸ Kaiser (2011a: 84–9; map 3.4).

²⁹ Of the ten widest streets in Pompeii, seven are Depth 1 from the gates.

³⁰ Kaiser (2011a: 54; 2011b). ³¹ Kaiser (2011a: 59–66, 74–7, tables 3.2–3.5).

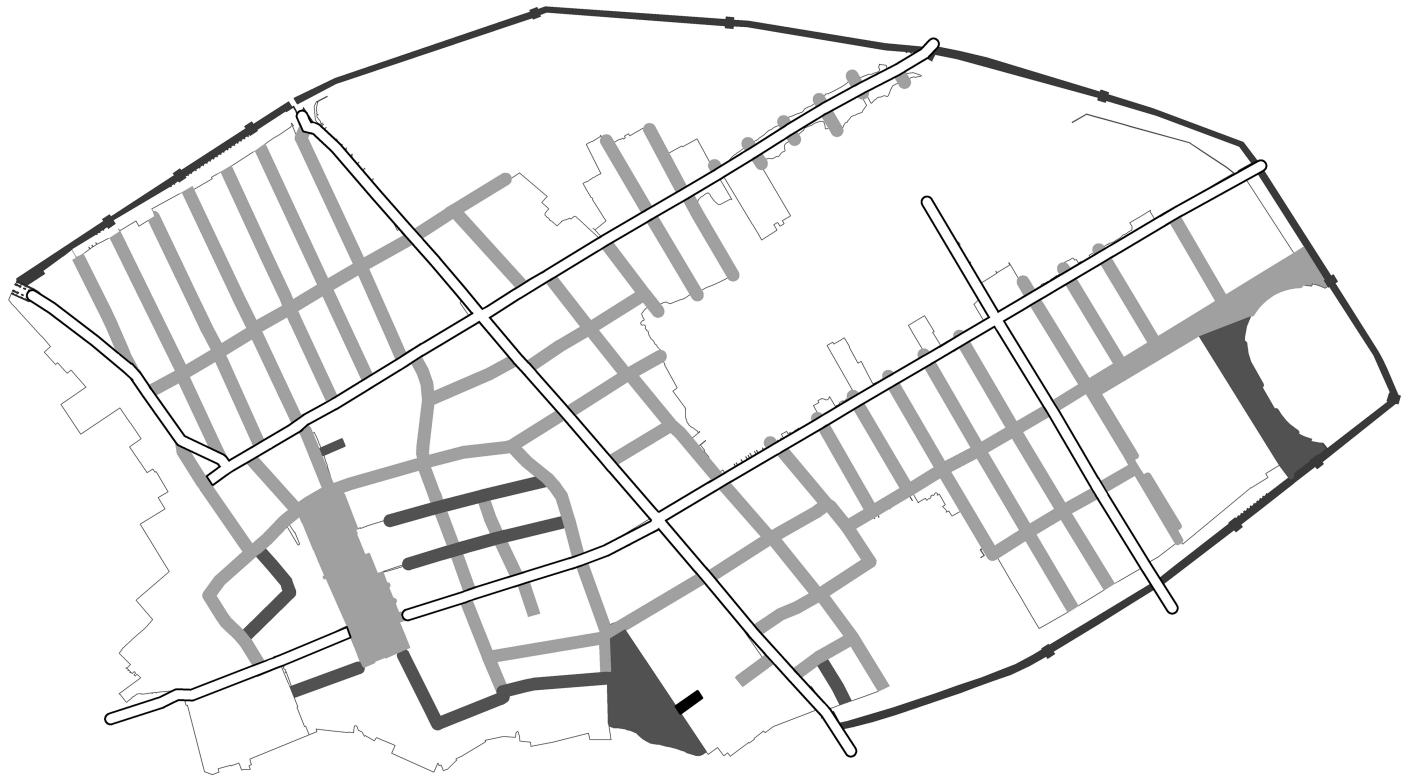


Figure 6.5 Depth from gates at Pompeii. After Kaiser (2011a: map 3.3). Depth 1, white; Depth 2, light grey; Depth 3, dark grey; Depth 4, black. Map: Eric Poehler.

properties sited along them, however, is equally prosaic: commercial, production, and residential properties tend to be found along streets with low Depth from both the gates and the forum. Simply looking at the map will reveal most of these same patterns. When one considers the logic behind the implementation of the method and the interpretation of its results, the value of those results shifts from accurate but uninteresting to potentially misleading.³²

The first problem with Kaiser's method is that it employs only 'to-movement', or movement toward, which measures only the value of movement between a limited number of origins and any particular destination. Although he tried to add nuance to the method by integrating the number of intersections along a street, this does not actually model the impact of the use of streets by those whose destination is not on that street, or 'through-movement'. 'To-movement' models only a tiny fraction of the connectivity that the streets actually create.³³ To illustrate the difference, imagine drawing the most direct route between any of the city gates and any location, for example the forum. Now imagine all the other possible paths across the city that might use a portion of our first route, but never reach either the gate or the forum. The difference is literally millions of unacknowledged paths.

A second methodological concern leads to one of the greatest interpretive problems with Kaiser's use of space syntax analysis. In order to determine the statistical significance in the counts of observed and expected property types along streets of different Depths, Kaiser employs a chi-square test and identifies those instances in which the distribution of property types varies significantly from a pattern of random distribution. Randomness, however, is not a meaningful variable to exclude from statistics on an urban environment. A city is a concatenation of behaviour, active, passive, constrained, conscious, or unconscious, but never random.³⁴ Randomness is, of course, analytically useful, but to exclude it is simply to point out that whatever caused the pattern to be created is observable in the data correlating streets and property types. The correlation in this case, Depth, has, however, no ability to identify its cause. Kaiser sometimes seems not to be confused on this, and in several instances makes a more nuanced general statement or takes a more particularist

³² For example, Kaiser (2011a: 77) notes that the only pathway that is at a Depth of 4 from the city gates is the stairway between the Triangular Forum and the Quadriporticus, making it 'the most remote part of the street network in the entire city'. Such Depth value suggests that this stairway is the least-likely travelled path in the city. This conclusion is difficult to countenance given the stairway's monumentality, its great width (3.4 m), and the locations that it connects.

³³ That is, 'to-movement' models only one path, which, translated to 'through-movement', equals only 1/total number of nodes. In the case of Pompeii, this is 1/2467th or 0.04% of all possible movement that the network creates. By treating all seven gates equally as one single node, this use of Depth analysis still further simplifies its results, which is why the level Depth 2 covers so much of the city.

³⁴ Kaiser is in fact pleased to report this reality (2011a: 99). For a discussion of the 'discourse' of Roman urbanism, see Revell (2009: 40–79).

approach to subsets of the data.³⁵ On the other hand, there are as many instances in which he conflates Depth itself with the cause of a property type's distribution along streets.³⁶ In several other occasions, it is stated that the Romans themselves understood and employed the concept of Depth in their decision-making processes.³⁷

There is, of course, a fundamental difference between the terms of an analysis and the translation of the results of that analysis into a description of historical forces. Bound up within correlations of a street's Depth and the properties along its length are a number of interdependent historical forces. Social factors, such as the idea of moral geographies, create zones of inclusion and exclusion of activities. The relative isolation of brothels away from main thoroughfares and the exclusion of wheeled traffic from the forum have been explained by such moral zoning.³⁸ Additionally, urban landscapes and their varying architectural environments impose a wide array of psychological impacts on human beings using those environments. The width of streets, the height, quality, and types of buildings, and the amount of pedestrian and vehicular traffic as well as the proportion of these two traffic types, all influence the decisions about activities within and along the streets.³⁹ Economics, of course, also played a crucial role in determining the location of property types and it is this factor that we are attempting to isolate in the present analysis. There is also the simple fact that, although we examine Pompeii at a specific moment in time, that does not mean we can treat the forces that acted upon it as equally synchronic. The position of any property along any street is contingent upon all these factors *and* upon their specific expression within a particular time period. For example, the insulae east of the forum were not always disconnected from it and therefore most of the buildings here relate to a time when their Depth from the forum was 1 and not 3. The Depth of property types is an effect of all these intersecting historical forces, which is why it correlates with them. Yet Depth is too blunt an instrument to dissect these individual forces nor can it stand in for all of them collectively. For example, Depth 2 not only covers 54 per cent of all streets (by length) in Pompeii, but also overlaps all of Laurence's categories of doorway density (Figure 6.6). That a single analytical unit (Depth 2) covers so much of the city's space and encapsulated so great a diversity of the intensity of its use clearly undermines the value of Depth to explain forces of urbanism at Pompeii. Depth, metaphorically, is not the distance the ancients walked, it is

³⁵ Kaiser (2011a: 82, 85, 104).

³⁶ Kaiser (2011a: 58, 78, 79).

³⁷ Kaiser (2011a: 54, 55, 105).

³⁸ Laurence (1995); Wallace-Hadrill (1995); McGinn (2002). Although I disagree that wheel ruts can be used as supporting evidence for moral geographies, I do agree that such informal zones exist and had real-world effects.

³⁹ Lynch (1960); MacDonald (1992).

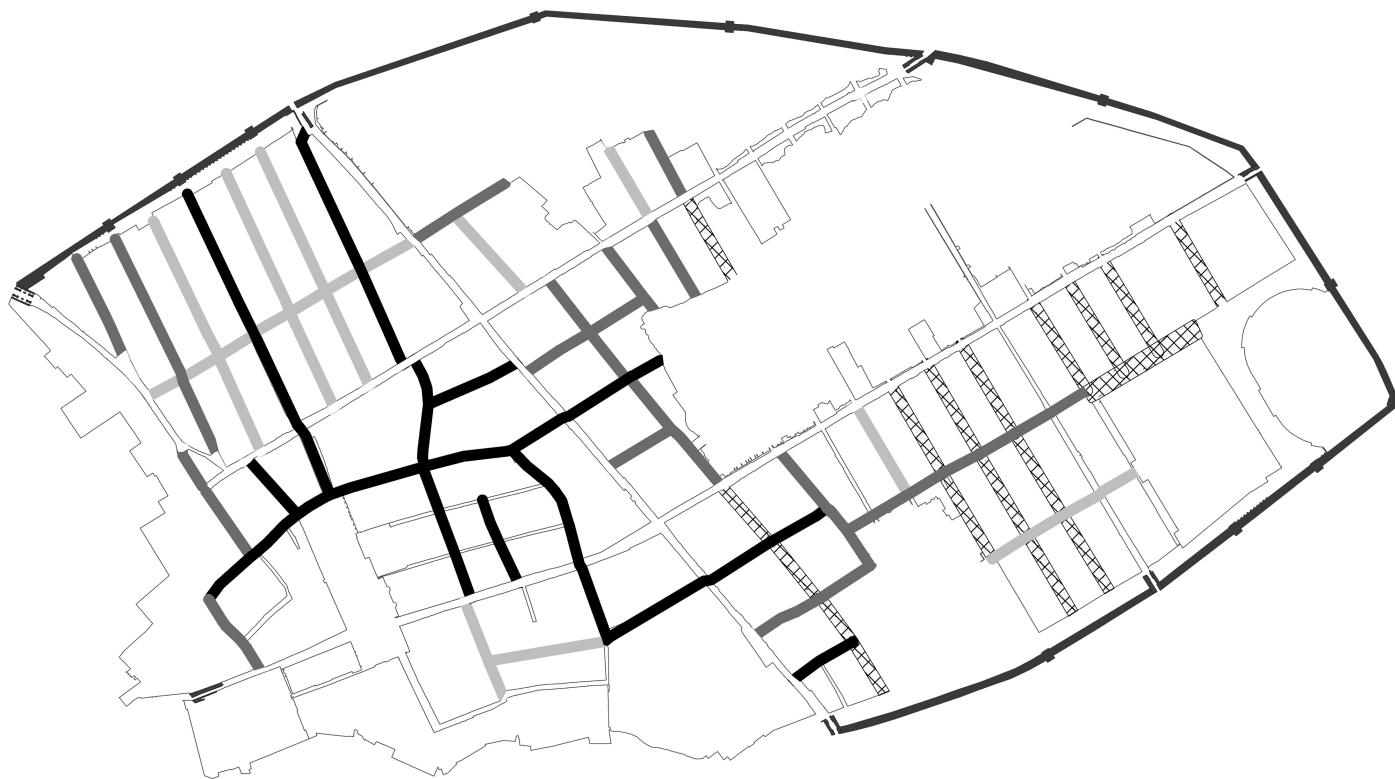


Figure 6.6 Doorway occurrences with Depth 2 from gates. After Kaiser (2011a: map 3.3) and Laurence (1994: maps 6.1–4). All streets, Depth 2. Doorways 0–5 m, black; doorways, 6–10 m, dark grey; doorways 11–15 m, light grey; doorways 15+ m, cross-hatching. Map: Eric Poehler.

the ruler we can use to measure that distance, and while the reason for walking might be unknown, that reason was certainly not the ruler.

A NEW MODEL: GIS NETWORK ANALYSIS

Taking the criticisms of these methods together, we can define the general problem that a new model of movement must overcome: because we use an image of the city as a proxy for movement and then compare it against another image of the city as a proxy for economic behaviour, the results hang dangerously close to a tautology (if not reaching it). Put most plainly, we count doors to measure movement and then we use that movement to explain the presence of the doors and functions of the space they access. Moreover, none of the previous methods has given due consideration to the impact that people moving *through*, rather than *to*, an area had upon the development of the urban landscape, and consequently, the range of economic responses to that movement. The absence of this volume of people is critical because *all* movement is conducted between origin and destination.

In what follows, I outline and discuss a more accurate, but still imperfect model to quantify and visualize pedestrian movement in order to understand better how movement patterns might relate to the variable intensities of economic behaviour we see along the frontages. At the heart of this model are the network analysis tools in geographical information systems (GIS) software. Network analysis in GIS is a set of tools based on graph theory and informed by the topological constraints of a specific network to describe the behaviour of flows within that network. As in space syntax, network analysis stresses the understanding of the shape of the network, as it has a far greater impact on movement than does any individual or group of destinations.

The Network

The basic network dataset is a series of points (nodes) that represent doorways into properties and lines (edges) that describe the street network and connect the points to it.⁴⁰ Because the city is not fully excavated, it was necessary to extend the street network between the extant streets. These street extensions are shown in Figure 6.7 in black. The streets in the unexcavated areas in regions I, III, and IX can be confidently reconstructed based on recent geophysical work and the known sections of these streets.⁴¹ Greater caution

⁴⁰ The city gates are also nodes.

⁴¹ Fiore and Chianese (2008).

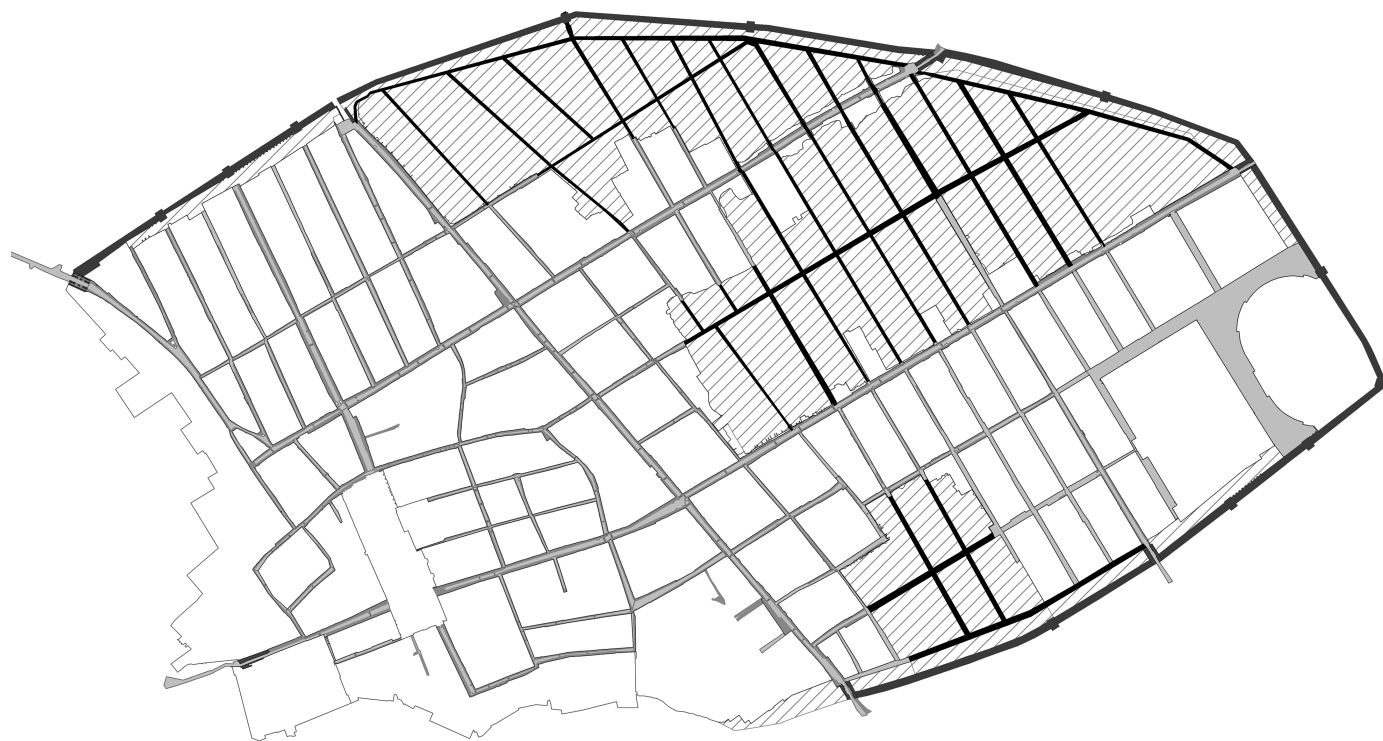


Figure 6.7 Street network of Pompeii. Excavated streets, grey; extrapolated streets, black; unexcavated areas, diagonal hatching. Map: Eric Poehler.

is warranted in regions IV and V, especially in tracing the inner pomerial street between Porta del Vesuvio and Porta di Nola. Excavations at the once-called Porta di Capua have shown the continued presence of a street (if atop debris) midway between the gates, as well as doorways opening into this space.⁴² The presence of an inner pomerial street between Porta di Nola and Porta di Sarno further strengthens the reconstruction of its continuation all the way to the Porta del Vesuvio. Reconstructing the complete street network is essential to the accurate modelling of movement, as the exclusion of possible routes from the analysis will bias other routes, skewing the results of potential movement.⁴³

For the same reasons, though with less impact on the model, it was also necessary to extrapolate the number of doorways that would exit from the unexcavated insulae and their distribution around these blocks. To accomplish the extrapolation, calculations of the doorway distributions in the excavated parts of the city were made by counting the doorways around the perimeter of all excavated insulae. The area of the insula was then divided by the total doorway count to find the average number of square metres served by each door. The lower the number, the greater density of penetration into the space and the greater the overall façade use. Visualizing these data reveals several general trends (Figure 6.8). The overall trend among these data confirms the long-held and well-established observation that the intensity of the use of space reduces as one moves east across the city. Within this overarching trend, however, more localized effects can be observed, such as increased intensity of use in the area east of the forum,⁴⁴ along Via del Vesuvio–Via Stabiana axis, and at the city gates. Less intense use of space can be seen to occur among the insulae that abut the city walls, and (unsurprisingly) those blocks that are partially or fully composed of monumental public buildings.⁴⁵ These trends are themselves intensified or mitigated by the effects of important streets—those that connect to gates, the forum, cut wide transects across the city, and/or are more than a single lane in width.

Once the profile of the doorway density in the excavated insulae was known, this was used as a baseline for doorway densities in the unexcavated insulae of the city (Figure 6.9). A density value, however, does not explain where the doorways should be placed around each unexcavated insula. To make this

⁴² Etani, Sakai, and Ueno (1996).

⁴³ For example, Kaiser (2011a: map 3.4; 2011b: fig. 8.2) does not consider the continuation of Via Mediana eastward, which would change at least three of his twenty-three Depth 3 streets (13%) to Depth 2 from the forum. Because Kaiser did not publish the data on property identifications, it is not possible to assess if this would alter his results of correlation between Depth and property function.

⁴⁴ The insulae 'behind' the forum to the east include Insulae VII 9 to VII 14.

⁴⁵ Two monumental buildings with significant shop space built into them, the Forum Baths and the Macellum, are exceptions to this observation.

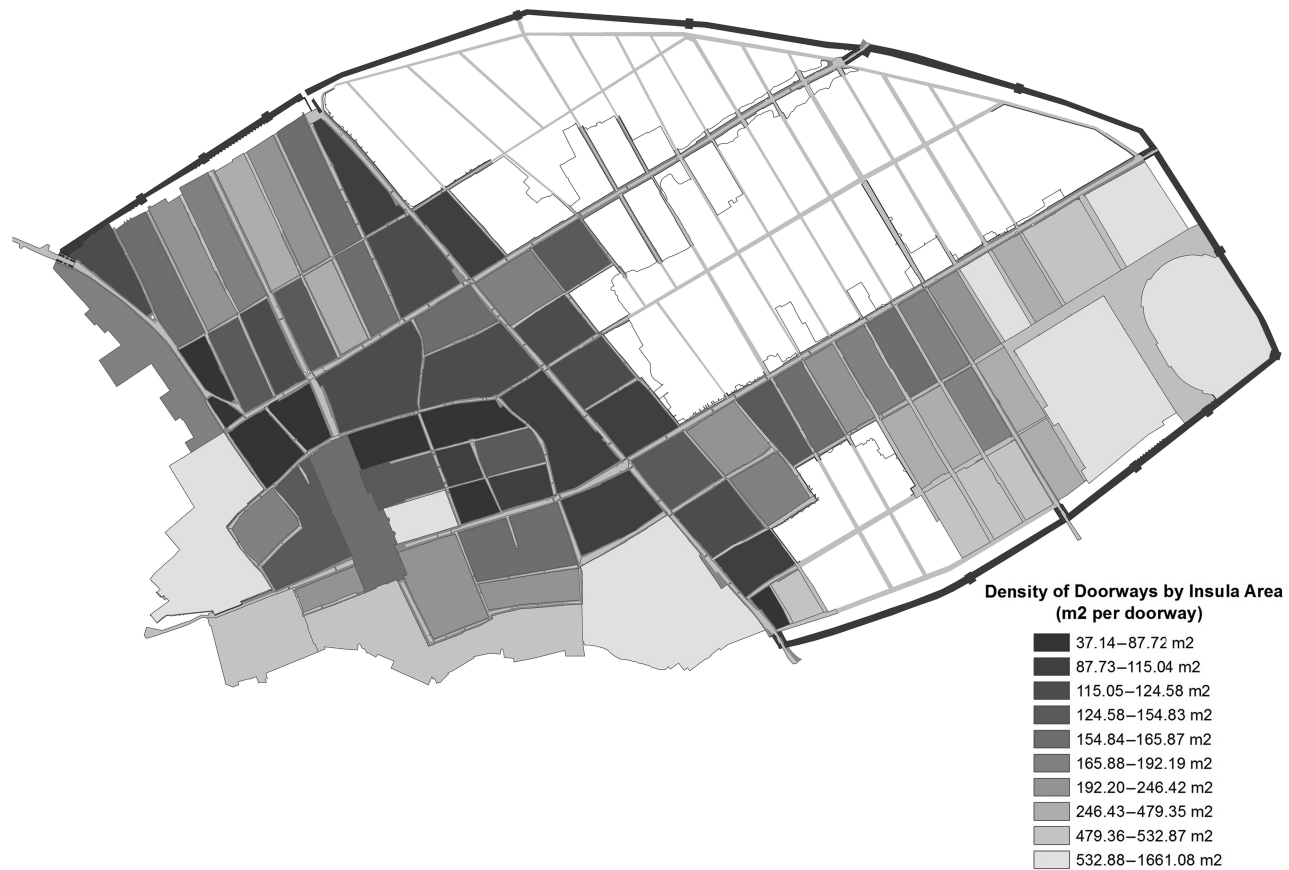


Figure 6.8 Doorway densities, excavated areas. Map: Eric Poehler.



Figure 6.9 Doorway densities, excavated and extrapolated areas. Map: Eric Poehler.

approximation therefore required an equally careful consideration of the distribution of doorways in excavated insulae. Laurence had already done much of this work, showing that doorways tend to cluster on one or two sides, confirming the expectations that they would populate the façades of wider streets.⁴⁶ Such clustering by side can equally be seen in my own map of façade doorway densities (Figure 6.3). The shapes and sizes of buildings within insulae also tend to compound the focus upon one or two sides. Thus, the side facing a wide street tends to have not only more doors, but also doors that open into rather shallow spaces—the ubiquitous retail shop. These smaller spaces also tend to have no other entrances. Larger properties that take up the interior space of the block also tend to have a doorway onto the wide street, but, despite their size, have only one additional door on another side of the block, if they have a need for a back door at all.⁴⁷ These observations were paramount when the distribution of doorways around the unexcavated insulae was determined. I am under no illusion as to the precise reality of these doorway locations; but to be used in the network, the nodes had to be placed somewhere. Placing doorways in locations informed by the broad patterns found in the excavated parts of the city, however imprecise, does serve as an antidote to the rigidity of a purely numerical approach to doorway distributions. Figure 6.9 shows the great local variation in the excavated insulae that might be flattened by strictly mathematical extrapolations.

Of course, even if carefully reconstructed, the character of the unexcavated area will remain necessarily speculative. On the other hand, that speculation is on a spectrum. Thus, we can have great confidence in the position of the street network; we can also be sure that the extrapolation of the total number of doorways in the unexcavated insulae is not far off; the exact distribution of those doorways around the insulae is less certain; the specific locations of doorways along a particular façade is least secure of all. The strength of this network model is that it relies primarily on the street grid and the aggregated results of the number of doorways. The primacy of the street grid means that where along an insula façade a doorway is placed is far less important than that it exists at all. Moreover, the aggregation of all doorways reduces the value of any given door's existence: at nearly 2,500 total doorway nodes, a single doorway has only a 0.04 per cent impact on the model. The 454 doorway nodes placed in the unexcavated areas are only 18.5 per cent of the total, meaning that even if 25 per cent of all extrapolated doorways are wrongly placed or should be removed or duplicated, the impact on the full model is only 4.60 per cent. Thus, for the calculation of paths, the specific location of a doorway is of relatively little value. The preceding paragraphs are intended to present the data and assumptions that constitute these reconstructions of

⁴⁶ Laurence (1994: 104–13, map. 7.2).

⁴⁷ Proudfoot (2013) has challenged the primacy of the *fauces* entrance.

unexcavated Pompeii because, whatever the reader's assessment of their accuracy, not to make such an extrapolation would ensure the failure of any network analysis of the ancient city.

In total, the network built for Pompeii consists of 2,467 nodes (doorways) and 2,434 edges (street network segments)⁴⁸ that generate and carry 3.25 million paths (Figure 6.10).⁴⁹ With the network structure complete and the full complement of destinations placed, it becomes possible to compute the path a person would take from any point in the city (an origin) to any other and every other point (the destinations). Figure 6.11 visualizes this concept for a single location, showing all paths to the Temple of Apollo from all other origins. The paths closest to the temple were used in nearly all trips, those further away being used least. By running a route analysis from every point in Pompeii to every other point it is possible to add all routes together, producing a composite plan of all potential movement at Pompeii as distributed by the ancient city's particular network of streets (Figure 6.12).

Such a plan returns us to Appadurai's challenge to use 'things-in-motion [to] illuminate their human and social context', as quoted at the start of this chapter.⁵⁰ Individual paths in the network model are of limited value. We cannot know the purpose of travel and the particular motivations that might have informed how that travel was conducted. These are the motivations that encode individual items and actions with their meaning. Together, however, the sum of all paths effectively averages out motivation by expressing all possible intentions for movement as subjected to the confines of the network. Returning to the metaphor that opened this chapter, we still cannot observe fish in the ocean and divine what was driving their migration. Using network analysis, however, it is possible to reconstruct what currents might have carried them, where those currents were strongest, in what direction they flowed, and what kinds of places they passed along the way. Still, it must be remembered that this model itself is incomplete and flawed in its own ways. The model's movement intensities and the correlations with building types that follow should be understood as preliminary and in need of refinement. Some of those flaws and refinements are known and admitted in the conclusion of this chapter.

Figure 6.12 represents the intensity of use along these paths, the currents, through colour and line thickness.⁵¹ As is immediately apparent, movement in

⁴⁸ There are 4,905 total edge segments, including those connecting a node to the street network. The connecting edges were excluded when finding highest percentages of use. I am deeply grateful to Alexander Stepanov for his help in running the network analysis.

⁴⁹ The model was run using Python and the NetworkX library. Due to computational speed, the node pairs were broken into eight groups and run simultaneously on eight machines. Each process took approximately ten hours to calculate.

⁵⁰ Appadurai (1986: 5).

⁵¹ The map is visualized as path weight divided into ten classes using quantiles to get sufficient sensitivity to local changes.



Figure 6.10 Network of excavated (black dots and lines) and extrapolated (grey diamonds and lines) doorways and streets at Pompeii.
Map: Eric Poehler.

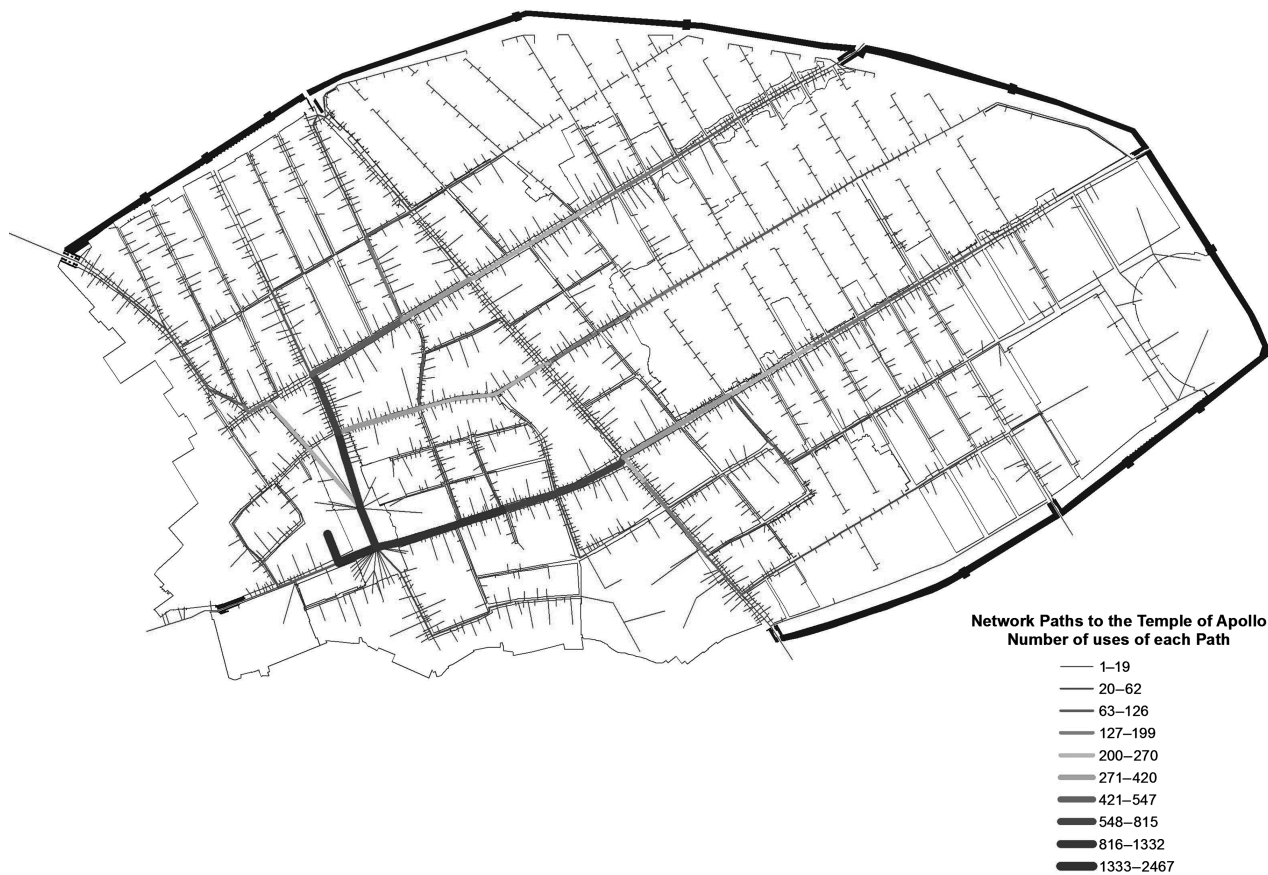


Figure 6.11 Intensity of movement through the network; all paths to the Temple of Apollo. Map: Eric Poehler.

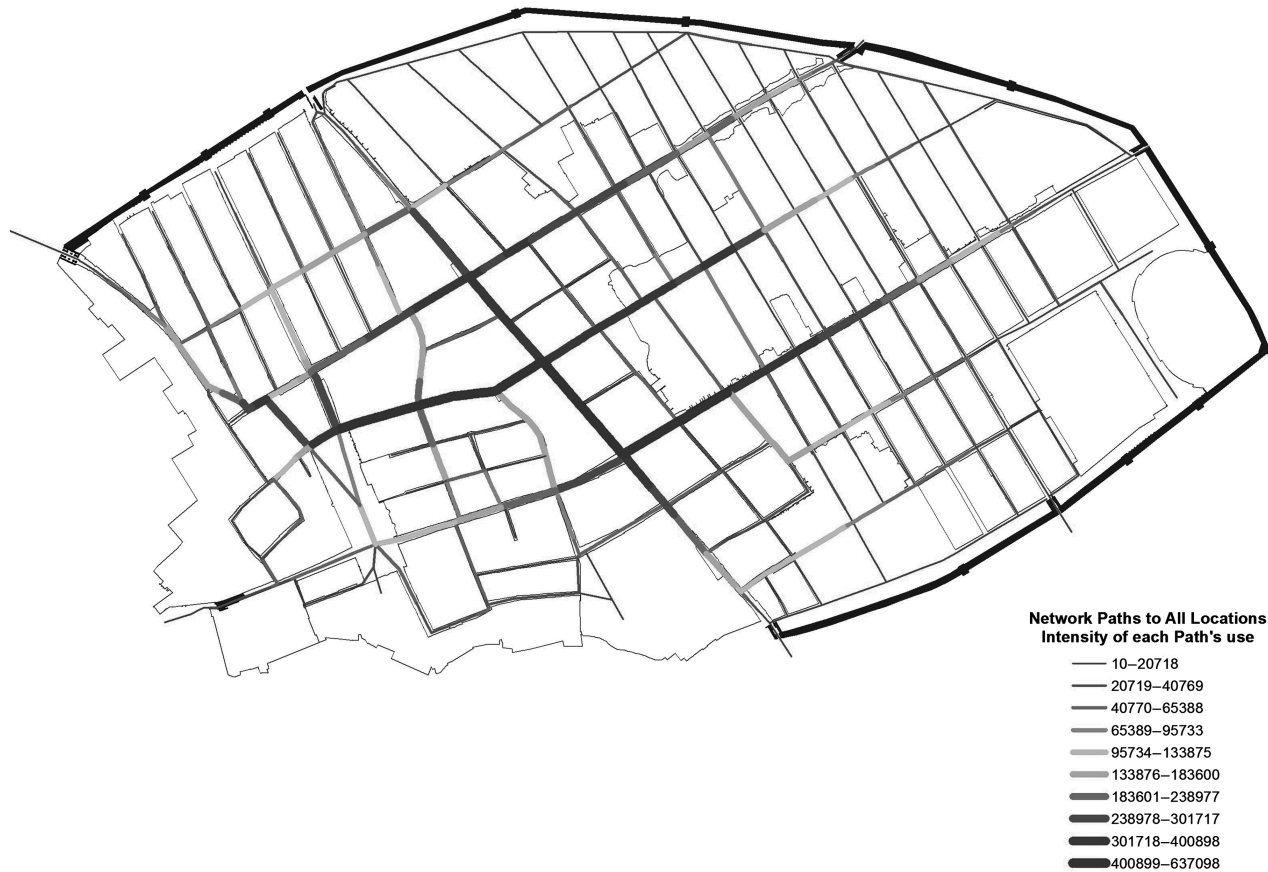


Figure 6.12 Total intensity of movement through the network; aggregation of all paths to all locations. Map: Eric Poehler.

Pompeii was most likely to occur along a few routes that were crucial to the network. Three street segments form an elongated 'Z' pattern and integrate the network: Via degli Augustali, Via Stabiana between Via Mediana and Via dell'Abbondanza, and Via dell'Abbondanza east of its intersection with Via Stabiana. The importance of these streets is not surprising and the heavy use of Via Castricio, Via Mediana, and the Via della Fortuna/Via di Nola line is also to be expected. Other streets, however, carried much more traffic than might have been anticipated. For example, the intersection of Via Consolare, Vicolo di Modesto, and Via delle Terme generated a short but intense confluence of movement. Because of their connection to Via del Vesuvio, Vicolo di Mercurio and Vicolo delle Nozze d'Argento were surprisingly busy streets. As Laurence suspected, Vicolo dei Vettii was a well-used street and part of a longer route that provided an alternative to Via Stabiana.⁵² Similarly, the streets that connect through region I's unexcavated areas—Vicolo delle Conciapelle and Via della Palaestra—reveal an important southern route across the city, taking pressure off Via dell'Abbondanza and Via di Castricio. Perhaps the most unexpected of all are the various north–south routes in the eastern half of the city, including several segments in the unexcavated areas of regions III and IX, the exceptionally strong integrating role played by the narrow and unpaved Vicolo di Paquius Proculus, and, finally, a meandering minor route between the Porta di Nola and Amphitheatre area using a portion of the eastern interior pomerial road.

The other pomerial streets, however, are remarkable for having little to no importance in the network. Other streets are also surprisingly undertravelled. Via Mercurio, which connects to the forum and gives access to a number of large residences in its northern segment, diminishes in intensity of use as precipitously as do the other, much narrower streets in the north of region VI. On the other hand, the position and size of the Casa del Fauno appears to have nearly completely quieted the non-integrating streets that border it: Vicolo del Fauno and Vicolo del Labirinto.⁵³ Ostensibly one of the most important routes in the city, the section of Via dell'Abbondanza between Via Stabiana and the forum is, surprisingly, not one of the most used routes in Pompeii despite its connection to the forum. The reason is equally non-intuitive: the position of Pompeii's forum in the far south-west of the city and the blockage of many streets that formerly reached the forum undercut its expected distributive function.⁵⁴

⁵² This route is composed of Vicolo dei Vettii, Vicolo Storto, Vicolo di Eumachia, and Vicolo dei Dodici Dei.

⁵³ Vicolo della Fullonica also is reduced in this manner, though slightly less so due to the number of doors opening onto the street.

⁵⁴ For a diachronic consideration on the area west of the forum, see Newsome (2009: 123–5). The monumental isolation also exacerbated the forum's slightly more north–south alignment,

Finally, because the street network ends at the city gates, these exceptionally important nodes are treated only as a door to a building rather than as a door to the city itself. The effect of this is an unrealistic diminishing of street use as the gates are approached. Certainly both scholarship and common sense underscore the problem.⁵⁵ The problem can be overcome by giving a population 'weight' to the nodes at the gates. There is no reason to lose confidence in the present model, however, as the added number at the gates will raise the importance of the streets leading to the gates, but will not fundamentally change the overall distribution of movement across the city. Because the network of streets remains unchanged, new paths will not now become of greater value, but the increase in population moving through the gates will create greater proportional distance between the most and least used paths in the city. How such 'weighting' might be accomplished is discussed in detail in the section entitled 'Improving the Model: Place'.

Two specific examples serve to illustrate the value of the GIS network analysis approach to understanding movement in Pompeii and its economic impact. Insula VII 12 has thirty-four doorways distributed mainly on its northern (14) and southern (14) sides. The northern façade, however, witnessed 23 times more traffic along the Via degli Augustali than did the Via del Balcone Pensile to the south. Even the eastern and western streets,⁵⁶ which have only six doors total opening onto them, were 7.5 and 8.7 times busier than the southern street. Such a distinction is completely absent from the doorway occurrence model: all four streets are identically lumped into the highest use category. The space syntax concept of Depth does a far better job of finding distinction between these streets, particularly in Depth from the forum. It is impossible, however, to find nuance within these topological Depths: Is the topological distance of two steps in Depth the same everywhere? That is, while both Via degli Augustali and Via dell'Abbondanza are at Depth 1 from the forum, and both Vicolo del Balcone Pensile and Vicolo degli Scheletri are at Depth 3, Via degli Augustali (519,467 paths) saw 3.7 times more traffic than Via dell'Abbondanza (140,438 paths), and Vicolo del Balcone Pensile (22,559 paths) witnessed 10.3 times more movement than Vicolo degli Scheletri (2,191 paths).⁵⁷ Such equivocation in category by the ORM and Depth methods is deeply misleading, as the network model shows exceptional variability amongst all of these streets.⁵⁸

which made a trip through the forum slightly longer. Whether this distance calculation would also be made by most ancient Pompeians is discussed in 'Improving the Model: Human Actors'.

⁵⁵ On gates as generators of space, see Malmberg and Bjur (2011); Poehler (2011).

⁵⁶ These are Vicolo del Lupanare and Vicolo di Eumachia, respectively.

⁵⁷ Because of the larger numbers in the fluctuation of path frequencies on Via degli Augustali, the lowest path frequency count on each street was used in order to create the fairest possible comparison.

⁵⁸ A future project using these results will examine the notion of moral geography at Pompeii as it relates to this section of region VII.

A second example returns us to the area of the Casa del Fauno and to the previous critiques of counting doors and counting turns. Where Laurence's doorway density method left us to guess at the apparent reduction street activity at the Casa del Fauno and Depth analysis did not suggest any difference at all, the quantification of paths allows us to see that this area as one part of a trend of diminishing use from east to west on Via della Fortuna. The reason for the diminishing use is the presence of several important routes nearby—especially Via del Foro/Via di Mercurio, Vicolo dei Vettii/Vicolo del Storto—that steered away much potential traffic that was not destined for the Casa del Fauno itself. Being able to see the siphoning off of 'through-movement' traffic by alternative routes allows us to escape the tautology of basing our interpretations of the development of façades on traffic flows that rely on 'to-movement' alone. That is, we no longer have to ignore the underlying circularity of saying that the busyness of a street, as measured by the number doors that open onto it, is the cause of the number of doorways on that street. Instead, we can produce a nuanced and quantifiable figure of a street's busyness that is based on the average of all potential movement paths within the city. What is more, we can now ask if such busyness had an impact on the number and functions of doorways along a street without falling into the trap of circular reasoning, and this holds enormous potential for our understanding of Pompeii's commercial landscape.

So, what was the impact of through-movement on the number and function of properties? Again, this model is incomplete. Additionally, this model cannot speak to specific properties and their particular histories, but rather to the broader trends of how property owners, by AD 79, might have reacted to the variable intensities of people on the move. Table 6.1 expresses the associations of four property types—Public Buildings, Houses, Shops,⁵⁹ and Bars⁶⁰—to four categories of movement intensity. The movement intensity categories are the top 10 per cent, 20 per cent, and 25 per cent of busiest streets in Pompeii (Figure 6.13) as well as the bottom 25 per cent (Figure 6.14). These percentages, however, are based on values of the frequency of use for each segment and not on the length of that segment. Therefore, the total length of the segments of each category and its percentage of all street segments is also listed.⁶¹ As the table shows, there is a vast difference in the total length of streets used in each movement intensity category: the top 10 per cent of busiest streets make up less than one tenth of the distance of the bottom 25 per cent. The impact of this is to

⁵⁹ From Eschebach (1970); Eschebach, Eschebach, and Müller-Trollius (1993).

⁶⁰ Ellis (2004; 2005).

⁶¹ The total number of street segments is 2,343 and their total length amounts to 18,201.76 metres.

Table 6.1 Association of property type with movement intensity

Movement intensity	Street network			Movement associations by property type							
	Count of segments	Length of segments	Percentage of segments	Public buildings	%	Houses	%	Shops	%	Bars (Ellis)	%
Top 10%	243	756.30	4.2%	8	17.0%	50	11.4%	135	23.0%	24	16.3%
Top 20%	486	1,494.60	8.2%	12	25.5%	82	18.6%	253	43.1%	43	29.3%
Top 25%	609	1,953.93	10.7%	15	31.9%	102	21.2%	318	54.1%	55	37.4%
Bottom 25%	609	8,537.22	46.9%	6	10.6%	87	19.8%	30	5.1%	30	20.4%

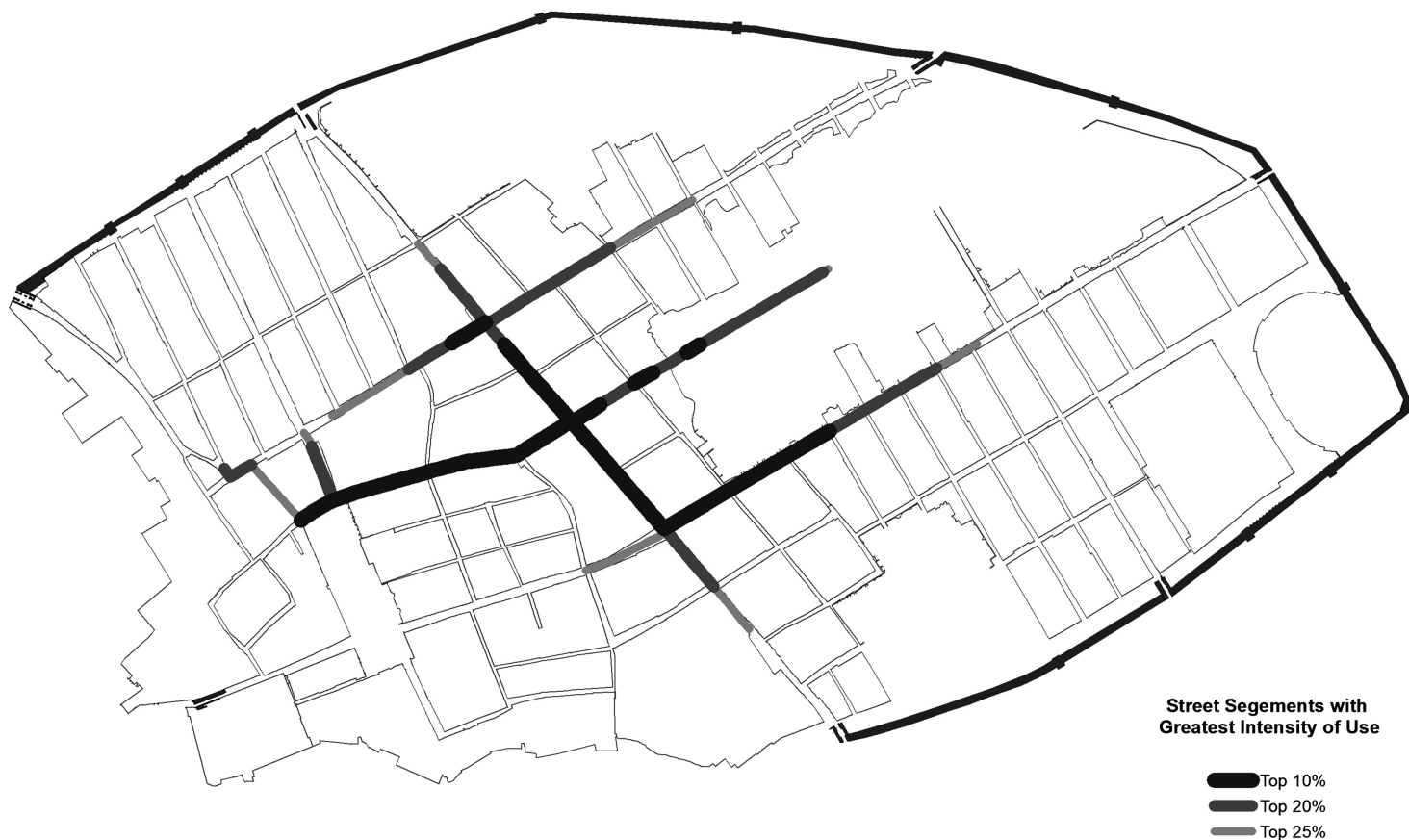


Figure 6.13 Street segments with the greatest movement intensity. Map: Eric Poehler.

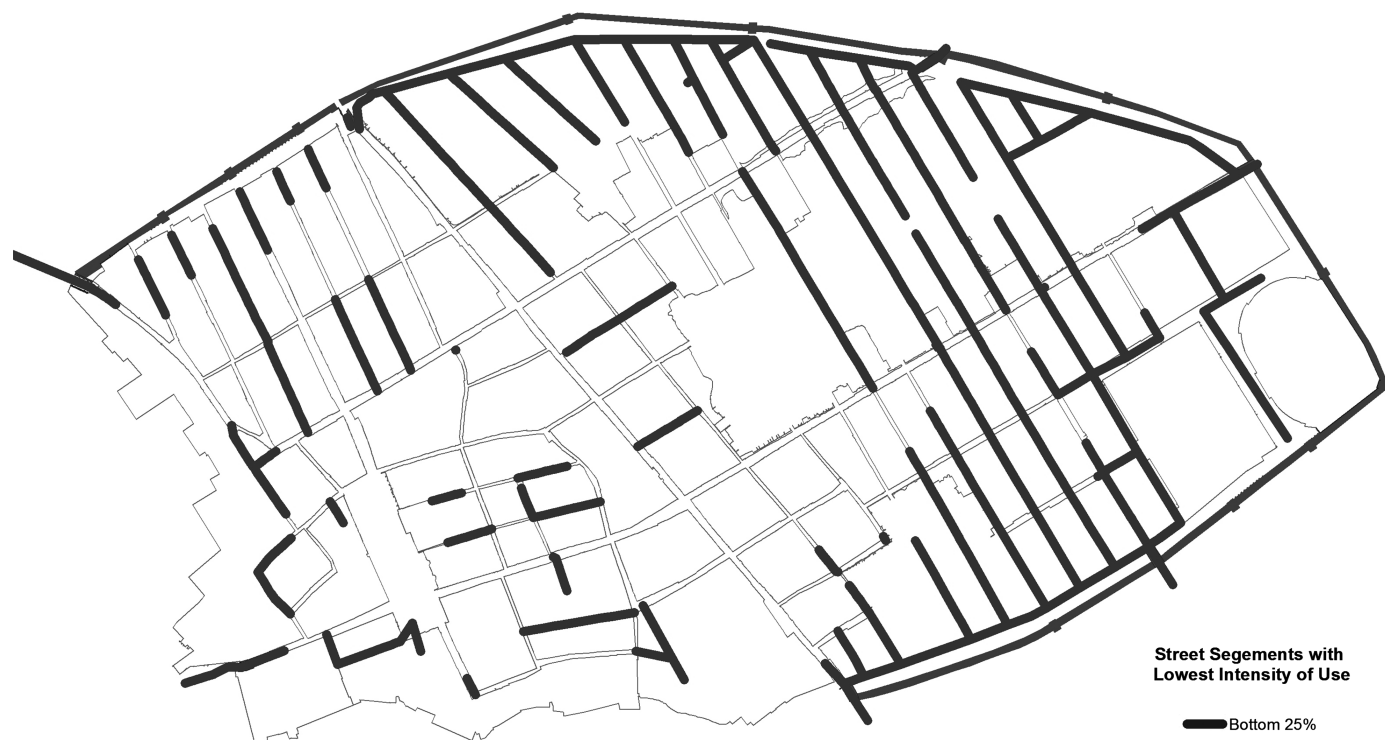


Figure 6.14 Street segments with the least movement intensity. Map: Eric Poehler.

further intensify the association or dissociation of property types with movement, which is included in the following discussion.⁶²

The results show that the forty-seven public buildings (including temples) are somewhat correlated with busy locations, with nearly one-third being found along the top 25 per cent of busiest streets (10.7 per cent of total street length). The dissociation with the least used streets further supports the weak correlation. Houses, however, show no correlation with the intensity of movement passing their front doors. Indeed, the top and bottom 25 per cent of movement intensities have nearly the same proportion of the 440 houses at Pompeii. Conversely, shops have an exceptionally strong correlation with number of people using a street: 54.1 per cent of all shops are found on the busiest 10.7 per cent of street lengths (top 25 per cent), while only 5.1 per cent exist on the quietest 46.9 per cent of street lengths (bottom 25 per cent). These three of Eschbach's property types were chosen not only for their variability in kind (public space, residential space, and retail space), but also for the likelihood that they could produce reliable results. Public spaces are easily identifiable, and the high number of houses (440) and shops (588) meant that individual errors in identification would not skew the calculations. The final category relies on the data from Ellis' comprehensive archaeological survey of 158 properties containing masonry counters, which he used to define the Pompeian bar. The identification of these properties, therefore, is the most reliable, despite the variability of their architectural forms and their smaller sample size. Bars, interestingly, are both strongly related to the busiest locales and also have an important profile in the least trafficked areas. That is, 37.5 per cent of all bars are found on the busiest 25 per cent of locations, but are also found with the same regularity as houses (20.4 per cent) in the least trafficked 25 per cent of streets.

How might we interpret these results (bearing in mind the flaws of this iteration of the model)? As I have argued, no single variable explains the collective forces that generate the urban topography, and the intensity of movement defined by this analysis will not be the exception. For example, when deciding the location for a residence, the number of people passing that location was not a deciding factor for Pompeians, except for where to put the front door. The slight correlation of public buildings and busy streets is best interpreted as historical: as the forum became monumentalized and as sacred precincts and entertainment districts were enlarged and enclosed, access through and around these places was diminished. Retail businesses, however,

⁶² It is obvious that the absence of strong movement at the gates is skewing these results, making associations with the top percentages weaker and the bottom percentages stronger. Similarly, the lack of attractiveness of public buildings—and to a lesser degree, houses and shops—is also skewing the results. Resolving these issues will be discussed in the section 'Improving the Model: Place'.

clearly were opened on the busiest streets in Pompeii and assiduously avoided placement (or failed!) on the least busy streets. The process of locating a bar also gave important consideration to the number of passers-by, showing their engagement with the movement economy.⁶³ Bars, however, also were successful in limited numbers on the city's backstreets. These examples point to the importance of neighbourhood economics—a variety of hyperlocalism in retail consumption—that underlies and complements the overall movement economy.⁶⁴

IMPROVING THE MODEL

Compared to both the occurrence of doorways and space syntax methods, the sensitivity of the model to change in the network analysis is significantly improved. The impact of a greater number of destinations can be observed within the length of a single city block, such as the section of Via Stabiana between insulae VIII 4 and I 4. Simultaneously, the network model shows the additive effect of through-movement on a street (e.g. Via degli Augustali), as well as the subtractive effect on a section of street (e.g. Via della Fortuna) of nearby streets that offer alternate routes. These results, though an exponential improvement over previous approaches, must be still further refined for future research on the movement at Pompeii. This section addresses three areas to be improved: variability in the importance of individual nodes (place), simulating Roman movement behaviour, and the evolving network of the Pompeian street grid. The discussion of these topics is intended to both expose to scrutiny and feedback the weaknesses of the present iteration of a network analysis as well as publicly to explore potential solutions.

Place

The first problem to examine is that the present model—like those critiqued—does not fully address the question of place; that not all doorways are equal indicators of movement. The model can, however, incorporate information about

⁶³ Ellis (2004; 2005). The neighbourhood model of consumption and the broader model of the movement economy have a rough equivalency to the household and commercial modes of transport economics. See Poehler (2011).

⁶⁴ Neighbourhood movement of this kind relies on 'to-movement' rather than 'through-movement', which is why previous analyses could find some correlation with economic behaviours.

the number of people to be anticipated at any doorway. Each node can be weighed against the number of inhabitants of a property that would use each door. The difficulty, of course, is not technical, but historical: How many people lived in Pompeii, how many lived in each building, and of those buildings that had multiple doors, how many would use each door? Chapter 2, discussing the possible number of inhabitants per room, offers a first solution to this topic for private properties, particularly residences. Public buildings will require further consideration as there are no inhabitants at this class of structure. Moreover, these buildings raise the issue that a doorway has not only 'weight' but also gravity; both outflow and inflow. Thus, the value of a building's movement potential is a function of both the number of inhabitants and the number of visitors. Shops, for example, will have far fewer inhabitants than visitors, but so too might large atrium houses. One way to model this might be to generate a 'visitors expected per property type, per 10 m²'. Thus, an average shop (39.3 m²) could be said to see ten visitors per day for every 10 m² of its size, while a workshop might only receive only one per 10 m². The Temple of Apollo might be assigned ninety-five visitors, or 0.5 per 10 m². In this way, the relative attraction to visitors of the different sizes of different property types in the city might be combined with the value of inhabitants entering and exiting each doorway. These values are all open for debate.

Similarly, the city itself saw a high volume of visitors each day that must be factored into a future model. How can we know how many people might have come through the gates? There are no data that I know of that speak to this question for Pompeii. We can, however, narrow in from a series of estimates to imagine what those numbers would mean in terms of people actually walking through the gates and what range therefore seems reasonable. Table 6.2 shows this concept. If we consider a very high-volume influx of visitors as a maximum, 50 per cent of the population for example, we must imagine that more than 850 people entered through the each of the seven city gates, equalling over seventy per hour.⁶⁵ Passage through the gates did not occur evenly through the day, or during the year for that matter, but rather was concentrated in peak morning and afternoon hours. If half of the visitors entered during only three morning hours, the rate per hour doubles.⁶⁶ Of course, the gates themselves did not see an equal number of visitors and it seems appropriate that the largest and most important gate, Porta Ercolano, might have carried as much as 25 per cent of the daily traffic, if not more. Taking these

⁶⁵ A day is calculated as being 12 hours, whether those hours are preferred during daylight or regulated to overnight. Thus, total number people, divided by seven gates, divided by 12 hours.

⁶⁶ Thus, total number of people, divided by 2 (half arriving at 'rush hour'), divided by 3 (hours).

Table 6.2 Extrapolations of visitors to Pompeii by gate and time

Total Number entering	All gates				Individual gates					
	Percentage of population	Each gate, per day	Each gate, per hour	Each gate, per rush hour	Porta Ercolano, per day (25%)	Porta Ercolano, per rush hour (25%)	Porta Ercolano, per rush minute (25%)	Porta Sarno, per day (10%)	Porta Sarno, per rush hour (10%)	Porta Sarno, per rush minute (10%)
6,000	50%	857	71	143	1,500	250	4	600	100	2
4,000	33%	571	48	95	1,000	167	3	400	67	1
2,000	17%	286	24	48	500	83	1	200	33	1
1,000	8%	143	12	24	250	42	1	100	17	0
500	4%	71	6	12	125	21	0	50	8	0

suppositions and figures together means that if we are to entertain the idea that 4,000 people came to Pompeii in a single day, we must accept that someone sitting at the Porta Ercolano in the morning hours would have seen on average three people per minute entering the city during peak morning hours, including their animals, vehicles, or carried articles.⁶⁷ Surely one traveller every 20 seconds is an unrealistic rate. At 2,000 visitors, only a single person per minute on average would have entered the Porta Ercolano; still a high, but perhaps more reasonable rate. Conversely, is it reasonable under the lowest estimates that only fifty people per day entered through the Sarno gate? There are no facts to be found here; we do not know the actual ebb and flow of Pompeii's daily population. Still, this excursion into supposition and number play offers a way to visualize those numbers as an experience we can imagine, replicate, and compare with historical parallels.⁶⁸ And, in turn, this experience can help us choose among a series of possibilities ranging from logistically impractical to historically (and economically) inconsequential.

Human Actors

If we are concerned to include the value of the number of visitors to Pompeii, we must also be equally concerned with modelling how they would have understood and used the street network. Therefore, another area for improvement is in the way in which human movement is modelled. The algorithm used in this research finds the shortest path between two nodes and therefore presents an ideal kind of movement. There are two problems with using this method. First, it assumes that all actors possess a perfect knowledge of the street network, including knowing both the complete connectivity of all streets and the lengths of each segment. Knowledge of the network at this level, including that of native Pompeians, would be impossible. On the other hand, even first-time visitors would have had their navigation of the city informed by previous experiences. Fortunately, there is evidence in both the literary record,⁶⁹ and in the architectural articulation of Roman cities,⁷⁰ that can also be used to replicate the wayfaring knowledge of visitors and inhabitants. For example, in his second-century BC work *Adelphoe*, Terence has two characters, Syrus and Demea, negotiate passage through Athens.

⁶⁷ Thus, total number of people, divided by 4 (25% of travellers), divided by 2 (half arriving at 'rush hour'), divided by 3 (hours), divided by 60 (minutes per hour).

⁶⁸ For example, contemporary commuters to Manhattan double that area of New York City's population. See Moss and Qing (2012) and US 2010 Census <http://www.census.gov/hhes/commuting/data/acs2006_2010.html> (accessed 8 June 2016).

⁶⁹ Ling (1990); van Tilburg (2007: 49–51).

⁷⁰ MacDonald (1992); Westfall (2007).

- SYR. Do you know the colonnade by the meat-market, down that way?
 DEM. Of course I do.
 SYR. Go that way straight up the street. When you get there the slope is right down in front of you: down it you go. At the end there's a shrine on this side. Just by the side of it there's an alley.
 DEM. Which?
 SYR. That where the great wild-fig-tree is.
 DEM. I know it.
 SYR. Take that way.
 DEM. That's a blind alley.
 SYR. So it is, by Jove. Tut, tut, you must think me a fool. I made a mistake. Come back to the colonnade: yes, yes, that's a much nearer way and much less chance of missing it. Do you know Cratinus's house, the millionaire man there?
 DEM. Yes.
 SYR. When you are past it turn to your left, go straight along the street and when you come to the temple [of Diana] turn to the right. Before you come to the town gate, close by the pool there's a baker's shop and opposite it a workshop. That's where he is.⁷¹

The directions imagined by Terence are characterized by a desire to use noteworthy landmarks to establish the location of where changes in directions are to be made. Even without such referential directions, travellers could use the architectural language that overlaid Roman cities and was encoded in its architecture. The urban armature expresses the expectation of Roman urban settings to contain a very limited number of primary routes—often a single street—with important junctions articulated by connective architecture that signals the importance of the intersecting streets.⁷² An example from Pompeii, the Tetrapylon at the intersection of Via dell'Abbondanza and Via Stabiana, serves to illustrate this concept. The monument, built by Marcus Holconius Rufus, not only stands as testament to the man, but also, by its position on the west side of the intersection, as a signal to the forum's presence, though out of sight, further up Via dell'Abbondanza.⁷³ Certainly, the smaller tetrapylon at the crossroads of Via Stabiana and Via degli Augustali/Via Mediana—the second busiest place in Pompeii—now takes on greater meaning.⁷⁴

The literary and architectural evidence also illustrates a second problem with using a shortest path algorithm to model human movement. Human beings, independent of their knowledge of the network, do not usually choose

⁷¹ Ter. *Adelph.* 573–84. Translation: adapted after van Tilburg (2007: 50).

⁷² MacDonald (1992).

⁷³ For an attempt to reconstruct the armature of Pompeii, see Westfall (2007).

⁷⁴ The busiest location at Pompeii is the intersection of Via degli Augustali and Vicolo Storto/Vicolo di Eumachia.

to zig-zag across a city. Instead, we tend to compromise between the most direct and least complex routes. Both of these concerns can be overcome by a changing the movement algorithm from one that relies only on the length of an edge to find most direct path, to one in which the shortest path is balanced by the fewest number of turns.

Chronology

Future work should also address the necessary synchronicity of the model. Because Pompeii's street network was a product of multiple stages of evolution—stages still not yet fully agreed upon—the movement of people throughout the city, and its economic value, were also different.⁷⁵ The network built for the city's final phase can be adjusted to reflect these different phases, including the multiplicity of the interpretations that define them, by simply adding, deleting, or disconnecting streets. While excavation has defined many parts of the evolving street network, only a small percentage of the properties within the early insulae are known. Modelling the doorways that would lead onto these reconstructed networks will therefore prove more difficult. Unlike adding doorways to the unexcavated parts of Pompeii, estimating the number and position of earlier doors will not have the benefit of seventy-seven fully excavated insulae to balance one's interpretations. Still, the results are likely to reward the efforts.

As David Newsome reminds us, however, there is also much to be gained in considering smaller scale changes:

Pompeii, as elsewhere, had a fluid and evolving—which is not to say expanding—street system until its final day. Indeed, one could argue that the dominant causal factor of urban change is not expansion but the subsequent adaptation of practice within particular infrastructures.⁷⁶

Such incremental changes could have important changes on circulation in the city, changes that could inform and cascade into additional changes. For example, blocking Vicolo del Gallo's access to the forum by the expansion of the Sanctuary of Apollo had ramifications for the Casa del Marinaio and its neighbourhood.⁷⁷ What impact did this closure, by disrupting the distributive nature of the forum, have on movement in Pompeii? We have already seen that the forum's value for circulation was lower than might be expected because of such disconnections. An important question that can be posed by modelling these changes in a network analysis is whether such a change to Vicolo del Gallo made it easier to countenance the complete closure of the

⁷⁵ See Anderson (2013: 581–8) for the most recent consensus on the Pompeii's development and Ball and Dobbins (2013) for the most recent refutation of that consensus.

⁷⁶ Newsome (2009: 123).

⁷⁷ Newsome (2009: 124). Dobbins et al. (1998).

forum's east side two generations later. Likewise, it can be asked if the construction of the Popidian Colonnade two generations earlier, which blocked at least three streets in the south, made the changes brought by the Temple of Apollo's expansion more palatable.⁷⁸

The network analysis method is a way to model those changes, measure their impact, and interpret the choices Pompeians made in light of that impact. To accomplish this work, a chronological series of quantified movement maps might be generated to 'underlie' the final, synchronic map of Pompeii and identify the most durable intensities of movement as well as isolating the anomalies that appear in the wake of changes to the network. Moreover, those data expressed in the sequence of maps can be quantitatively rather than merely visually compared.

CONCLUSION

The conclusion to Ray Laurence's *Space and Society* is a critique of what he considered to be the over-functional, over-economic, and over-political interpretations of the complex social forces that drove Roman urbanism. It might be summed up in the following, co-opted phrase: 'It's the society, stupid.'⁷⁹ Indeed, Laurence goes on to say that 'models such as the consumer or service city fail to account for this complexity by reducing all social activity to its economic function'.⁸⁰ I would agree that these models have failed to explain the complexity of Roman urbanism, but not only because they are too economic and too little social, but also because they are too simple. The same has been true of the *methods* we have used to study urban forces. While there is elegance to the simplicity of the 'occurrence of doorways' and space syntax approaches, they are like the watercolour paintings commissioned by Spinazzola during his excavations along Via dell'Abbondanza: drawn with too broad a brush, creating an image that is too imprecise, too impressionistic. In this analogy, network analysis is the digital camera, able not only to render an image with shaper focus, but also capable of instantly adjusting almost any setting in creating the image. In combination with an earlier literary tradition that minimized the role of elites in the non-agricultural economy, the broad results of these earlier methods lead to broad interpretations, the consequence of which was that many such interpretations relied on social rather than economic forces to explain the patterns

⁷⁸ Here I follow the Pompeii Forum Project's determination of a Sullan date for the Popidian Colonnade. See Ball and Dobbins (2013: 481–6).

⁷⁹ The original phrase, 'The economy, stupid', was coined by James Carville.

⁸⁰ Laurence (1994: 141).

these methods revealed. Thus we have moral geographies, but no indices, even relative indices of property value. The maps highlighting the top 10, 20, and 25 per cent of busiest streets can be seen as a first attempt towards this. For the future, we need to continue to explore the power of such social factors in the development of Pompeii, but not at the expense of economic forces. The pendulum must swing back, and we must consider how economic decisions are socially informed *and* how social decisions are economically constrained or incentivized. The present research and the abstraction of movement generated by it is a step towards remedying that imbalance.

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Urban Production and the Pompeian Economy

Nicolas Monteix

The aim of this chapter is to explore the possibilities offered by Pompeii for understanding the urban side of the Roman productive system—without neglecting the difficulties involved in doing so, and without denying the limits to our knowledge. It will propose some new approaches that could enable us to avoid some of the traditional pitfalls that have characterized past scholarship. The discussion deliberately starts from a broad definition of production, and one that is centred around the notion of ‘craft’, which, in an urban context, is understood as ‘an activity based on the application of technological knowledge that uses (cognitive or material) tools and tends to produce added value’.¹ Essentially, focus will be on the economic activities of people involved in what Moses Finley called ‘petty commodity production’, and on the many often invisible people who sold their products.² This broad approach, which is essentially based on what the material remains have to offer, makes it possible, at least theoretically, to discuss a significant number of economic activities that are barely visible outside Pompeii.

Chronologically, the discussion will concentrate on the two last decades of Pompeii’s existence. The first part of this chapter will attempt to give an outline of the problems that limit the extent to which the site can be seen as a ‘time capsule’—a key issue even if it does not affect the relevance of studying the Pompeian evidence. The subsequent section will evaluate the insights that can be derived from the material remains of shops and workshops, and will discuss some of the recurring biases of the scholarly debates of the last decades. The final part of the chapter will briefly highlight some possible directions for future research.

¹ For a more detailed discussion of this definition cf. Monteix (2011: 7–14).

² Finley (1977: 326).

POMPEII: A DAMAGED TIME CAPSULE

Despite stubborn popular belief, it is not enough to just excavate Pompeii to be able to see a Roman city frozen in time. In a series of articles spanning the 1990s, Penelope Allison has highlighted the factors that have damaged the time capsule that Pompeii supposedly was.³ It is important briefly to review the key problems that compromise our understanding of the Pompeian evidence, so that we have a more realistic view of its possibilities. These problems are related to events preceding the eruption as well as to events following it.

From One Catastrophe to Another

At least since the publication of Amedeo Maiuri's book on the last years of Pompeii, the earthquake of the early AD 60s has occupied a central place in Pompeian studies.⁴ Paradoxically, however, the chronology of this major event in Pompeian history is still a hotly debated issue. As a result of two contradictory testimonies, one by Seneca and the other by Tacitus, the event is dated between AD 62 and 5 February 63.⁵ The principal arguments in the debate, which recently has been reopened, are philological—a hypothetical interpolation in the text of Seneca—and historical—the moment at which Seneca began to write the sixth book of the *Quaestiones Naturales*.⁶ Bar the very improbable discovery of an inscription referring to the earthquake and indicating a consular date, this means that the dating of this catastrophe, of major importance for our understanding of Pompeii, has no intrinsic relation to the archaeological remains. While the question of the date of the earthquake may be permanently unsolvable, it is relevant to note that, according to the testimony of Seneca, the earthquake seems to have been of an unusual magnitude.⁷ Without denying its importance, however, there are several problems related to the event mentioned in the literary sources. At least until the early 1990s, the overwhelming majority of scholars used to think of the earthquake of AD 62/3: (i) as one single event, and (ii) as the only factor to

³ E.g. Allison (1992; 1995; 2004: 11–26).

⁴ Maiuri (1942).

⁵ Seneca gives 5 February 63, under the consulship of Regulus and Verginius (NQ 6.1.1–2). The date of Tacitus is less clear: the earthquake is mentioned in the last paragraph that discusses the year 62 (*Ann.* 15.22).

⁶ Following the work of Onorato (1949), there long was a consensus in favour of a 62 date, but strong arguments against this date, first brought forward by Wallace-Hadrill (2003), then further discussed by Hine (2006: 68–72) and Savino (2009: 229–34), have now shifted the balance in favour of 5 February 63.

⁷ Sen. NQ. 6.1.1.: '*Pompeios [...] consedissee terrae motu*'. The damage in the other cities—Herculaneum, Nuceria, and Naples—are mentioned subsequently in order of decreasing magnitude.

explain the state in which the city was discovered by its excavators: it has been assumed that, in AD 79, Pompeii had still not completely recovered from the shock of the early AD 60s.⁸ Both assumptions are problematic.

It is first necessary to reconsider the idea that there was just one single earthquake. This idea was based solely on the literary sources, which are incomplete and Romano-centric. Only the enigmatic words of Pliny the Younger referring to the seismic events preceding the eruption of Vesuvius can perhaps be understood to suggest the existence of regular seismic activity in the area.⁹ The idea that there was more than one earthquake was first brought forward by Karl Schefold, who, in the discussing the chronology of the fourth style, theorized the existence of a second earthquake.¹⁰ While largely rejected by wall-painting specialists, this hypothesis began to enjoy some popularity from the middle of the 1980s onwards—outside the discourse on wall decoration for which it had been designed. It featured in almost all studies of the history of individual buildings of the late 1980s and early 1990s.¹¹ The debate was further brought forward by a 1993 colloquium, which produced two main insights.¹² In the first place, according to volcanologists, the seismic activity preceding the AD 79 eruption had a varying intensity with a peak in AD 62/3.¹³ Quite possibly, this seismic activity resulted in the marine transgression that can be observed at Herculaneum, where, in the course of the AD 60s and 70s, the earth ‘sank’ by a maximum of 2.5 metres.¹⁴ Secondly, it became apparent that the archaeological traces of this activity remain relatively rare and cannot easily be interpreted.¹⁵ For instance, to demonstrate that one or more earthquakes followed that of AD 62/3, it is essential to identify repairs—not just simple renovations—connected to an earthquake that clearly post-date other repairs that result from another earthquake. There are few places in Pompeii where this actually is the case.

A consequence of the converging—but still limited—body of evidence pointing to the existence of one or more earthquakes after that of AD 62/3 is that there is no reason to stick with the traditional interpretation that evidence for construction work in progress found in Pompeii was related to the initial seismic catastrophe. Moreover, in the absence of any fixed chronology—impossible to establish for the city in its entirety if there was continuous seismic activity—caution is

⁸ For example: Mau (1899: 10); Maiuri (1942); Étienne (1977: 15–23); Andreau (1984); Adam (1986: 85–7).

⁹ Plin. *Ep.* 6.20.3: ‘*Praecesserat per multos dies tremor terrae, minus formidolosus quia Campaniae solitus*’.

¹⁰ Schefold (1957: 152–3).

¹¹ E.g. Descoedres and Sear (1987: 34); Ehrhardt (1988: 61); Koloski-Ostrow (1990: 50); Seiler (1992: 84); De Caro (1994: 121–2).

¹² Fröhlich and Jacobelli (1995).

¹³ Marturanu and Rinaldis (1995: 134).

¹⁴ Cinque and Irollo (2008: 435–7).

¹⁵ Besides the contributions in Fröhlich and Jacobelli (1995), one can refer to the overview composed in 1993 by Luongo et al. (2003). Some examples should, however, be rejected.

appropriate: it would be unwise to replace the simplistic idea that the reconstruction works of the disaster of AD 62/3 were incomplete in AD 79 with an even more schematic model in which these works were all related to a late earthquake shortly before the eruption. On the contrary, only a detailed analysis of the extant remains of Pompeii makes it possible to expose what certainly constitutes the most interesting aspect of the last years of the city: the process of urban resilience, starting from the early AD 60s onwards, eventually partially finished but then probably renewed after new seismic shocks. Such an analysis would involve estimating the recuperation capacity of the city, as well as identifying what, before the earthquake of AD 62/3 constituted the 'normal' situation in the city, in order to try to evaluate if and how the elements of this normality continued to be present in the subsequent sixteen or seventeen years. Unfortunately, however, this is extremely difficult: most of our evidence comes from the period in which normal urban life was most disturbed.

Eruption, Partial Oblivion, and Rediscovery

The period in which Pompeii probably was suffering from seismic disturbances came to an abrupt end in AD 79. Because of a probable corruption in the text of the letter of Pliny to Tacitus, the precise date of this ultimate catastrophe has long been debated. However, numismatic evidence now might make it possible to exclude the traditional date of 24 August; instead, it points to a date somewhere in autumn.¹⁶ However, this difference of a couple of months has only a marginal influence on the present argument.¹⁷ More importantly, the burial of the city and the destructions related to it did not signify its definitive sealing. Still partially visible, the city was subjected to several salvaging operations. These were partially organized by the imperial government, as is probably indicated by Suetonius, when he signals the sending of *curatores restituendae Campaniae*.¹⁸ The principal activity of these curators would have been to foster the economic revival of the area that was most severely touched by the eruptions, as is attested by several inscriptions in the principal cities of Campania that were damaged by the eruption, but not buried.¹⁹ At Pompeii, it is likely that the curators conducted excavations to recover materials that

¹⁶ A letter of Titus to the inhabitants of Munigua (*AE* 1962, 288) and a military diploma (*CIL* 16.24; *AE* 1927, 96) dated respectively 7 and 8 September 79 give to Titus fourteen acclamations as *imperator*. A silver denarius, seemingly of the type *RIC* 19, discovered in the Casa del Bracciale d'Oro in 1974, gives fifteen acclamations to the emperor. The eruption that buried the coin with the person who carried it thus could not have taken place before 8 September 79. Cf. Stefani and Borgongino (2007). See, however, Abdy (2013).

¹⁷ The interpretation of the villas and of the goods that they contained would probably need to be revised.

¹⁸ Suet., *Tit.* 8.9.

¹⁹ Scarano Ussani (2003).

could be reused—essentially marble and metal. In doing so, they caused further damage to the public monuments; such damage was interpreted as damage of the earthquake of AD 62/3 that had not yet been repaired.²⁰ In this way, the exploitation of the ruins of Pompeii by the imperial government facilitated repairs in other cities affected by the disaster. Additionally, it is clear that, at a certain point after the eruption, some houses were visited by people—not necessarily their owners—through tunnels to recover precious or not-so-precious objects.²¹ For example, in bakeries, which were easily traceable because of their chimneys, the displacement of some mills, and general disappearance of lead boilers—only three of twenty-four were found—seem to be related to such visits.²² It is impossible to date these disturbances, and the loss of evidence resulting from them can hardly be estimated: only the most precise excavation reports refer to them.

A great deal of the complexity of Pompeian studies is, by the way, related to the particular form of disturbance occurring from 1748 onwards: the excavation of the site. Indeed, to understand the precise impact of the disturbances discussed, it would be desirable to see the site in the state in which it was discovered by its successive excavators. The original state of discovery, however, can only be reconstructed with great difficulty through the study of information in the documentary archives composed at the moment of excavation, and by the accounts of visitors who were able to see the excavation process with their own eyes.²³ While an integral publication of all the archives is still lacking, the outline of a critical analysis of these fundamental sources can be proposed (Figure 7.1).²⁴ Between 1748 and the middle of the twentieth century, the way in which excavations were recorded developed dramatically. In the beginning, records were little more than a letter informing a private owner—the king residing in Naples—of an extension to his collection of objects. Recording practice became more systematic after 1861 and, progressively, the inventories became complemented with notes describing the context of discovery more precisely than through simply mentioning a location.

²⁰ Zevi (1994: 51–6; 2003: 860–4).

²¹ Allison (2004: 21–4, 179–82).

²² In bakery I 12, 1–2, three out of four *catilli* have been displaced after the eruption. Cf. *Giornale degli Scavi di Pompei* (1961): ‘13–18 febbraio. [...] Si rinviene la coppa di un mulino di pietra calcarea vesuviana rotta e mancante di parte, il rinvenimento è avvenuto a circa 2 metri e 50 [d]alla superficie del piano di calpestio antico nella casa n°1 [...] 6–9 marzo. [...] In questi giorni [...] si rinvergono mure abbattute dallo scavo borbonico e piccoli ambienti a sinistra e a destra dello stretto corridoio. In oltre si rinvergono ancora: N°2 catilli di molino rotti e mancante di parte [...]’.

²³ Laidlaw (2007) has provided one of the few introductions to this issue, subsequently complemented by the overview of private archives published in the *Rivista di Studi Pompeiani* (2009: 13–32).

²⁴ Besides the fundamental synthesis based on the archives conserved at Pompeii by Castiglione Morelli del Franco (1993: 662–4), one can refer to the works of Berry (1997a: 105–12, 117–18) and Allison (2004: 30–2).

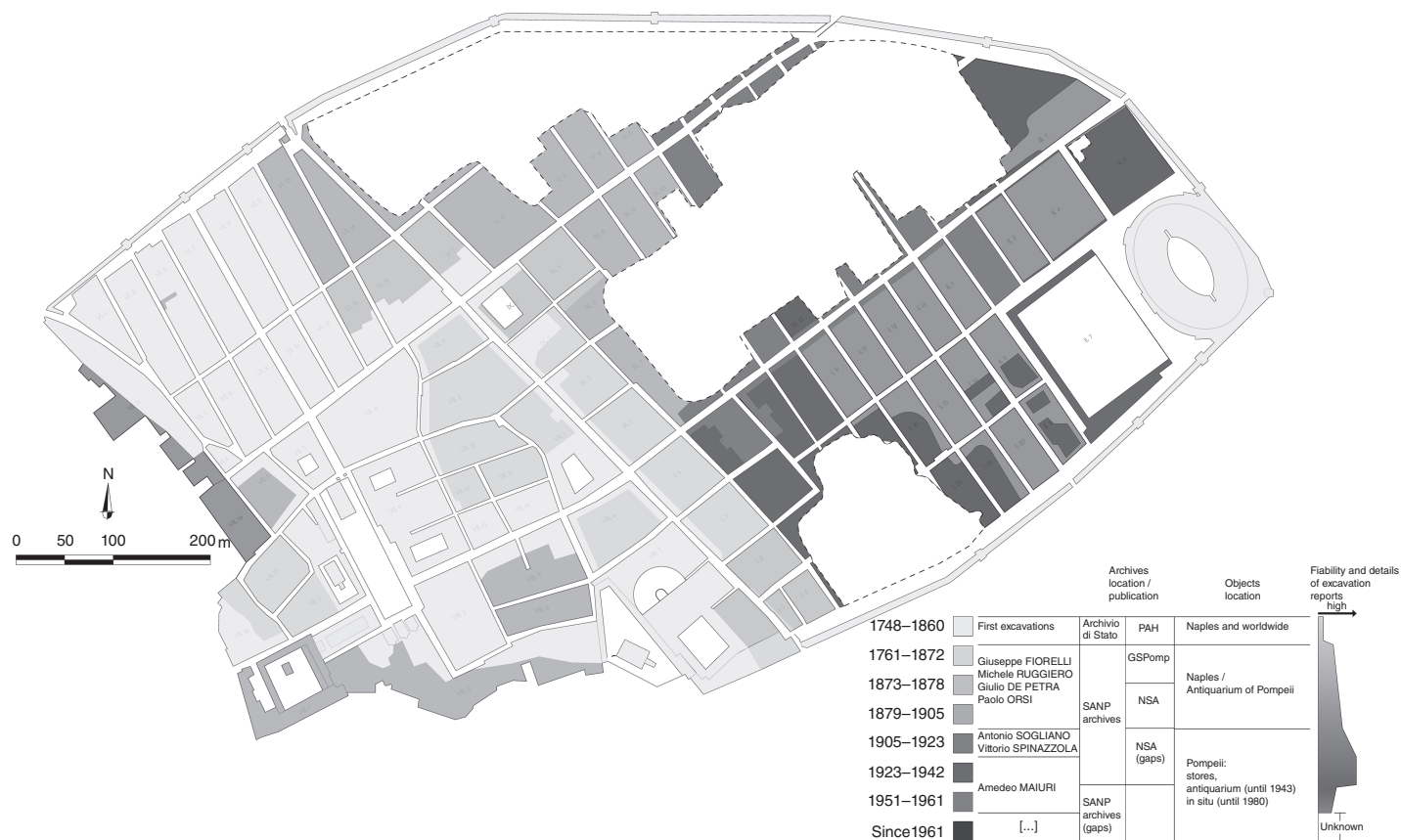


Figure 7.1 Chronology of the excavations in Pompeii. Map: Nicolas Monteix.

However, the quality and detail of the reports depended to a considerable extent on the persons who wrote them, and consequently differed from year to year and from period to period. Roughly, the excavation journals are particularly detailed and precise between 1910 and 1942. Particularly precious in the context of a study focusing on the remains of urban production are the descriptions of masonry work installations at the moment of excavation, especially when they have not been restored or conserved since.

The most serious recording problem is related to artefacts, and in the context of the present argument particularly to the recording of instruments, raw materials, and products that had just been manufactured or were destined for retail. In the course of the long history of archaeology as a discipline, the number of movable objects seen by excavators as having scholarly value has not ceased to increase, particularly during the last decades. Yet certain traditions are hard to erase: for the large majority of excavations, and until very recently, the priority in describing, recording, and conservation, was given to 'precious' materials—marble, silver, and bronze; only minor attention was given to glass, ceramics, and other materials, and often only to those objects that had been preserved in their entirety. Even for these objects, and even in periods for which the documentation is very rich, the inventory is not always straightforward. If an object is simply listed without further description, a detailed terminological exegesis is necessary to be able to determine its precise nature.²⁵ Besides the objects whose existence is recorded in the archives—in excavation journals and inventories—an incompletely inventoried collection of artefacts from Pompeii was, to some extent, preserved at Portici and later in Naples, though it has partially been dispersed as a result of 'diplomatic' visits to the site.²⁶ From 1905 onwards, all recovered artefacts were preserved on site, in the depots, in the Antiquarium, or at the location where they were discovered. Loss of information did not stop with the flaws of the inventories: many objects were destroyed in the Allied bombardment of 1943, which blew up the onsite museum. Furthermore, the displacement of objects from the place where they had been found in the late 1970s led to the loss of a large part of the contexts of discovery.²⁷

What has been said in this section gives just a basic overview of the problems that are encountered—and should be borne in mind—by all scholars working at Pompeii. They can be summarized as follows: the supposed 'time capsule' is, in practice, severely damaged. Far from being the archetypical example of the Roman city of the first century AD, Pompeii was buried at a

²⁵ On the difficulty of translating the nomenclature that was usually used in the inventories and journals, cf. Allison (2004: 34–6; 2006: 16–27).

²⁶ Cf. e.g. Jacobelli (2008).

²⁷ On this process, the only notes have been given by Allison (2006: 8).

critical moment in its history, when the city and its inhabitants were trying to recover from one or more earthquakes. Disturbances related to the eruption and subsequent events have strongly increased the distance between the scholar and the object of study. While this sometimes irreparable damage removes nothing from the wealth of evidence at our disposal at Pompeii—certainly compared to other sites—it necessarily limits the significance of the conclusions that one can draw from it. In the best case, studying urban production at Pompeii comes down to trying to understand the productive system of a city going through a period of recovery, and this process needs to be understood before anything else.

COUNTING THE STRUCTURES OF PRODUCTION

With the above reservations in mind, it is possible to evaluate our understanding of the urban productive system at Pompeii. I will start with briefly reanalysing a synthetic map which I published some years ago and of which I propose a second, updated version here (Figure 7.2).²⁸ In its original context, this map served to compare the productive landscape of Herculaneum with that of Pompeii to help the readers see the difference in scale between the two cities. Its title—‘Comparison of shops and spaces of production in the urban landscapes of Herculaneum and Pompeii’—was intended to be very clear to the reader, who received an impression of the *complete* commercial and productive landscape of the two cities. The map was essentially designed to highlight the shops and workshops that had masonry installations permitting their identification, including shops involved in food retail, bakeries, workshops related to textile production or lead-working, and salting installations. Comparisons within each branch of activity were facilitated by representing the number of typical installations for each workshop: the ‘productivity’ of each establishment was indicated by a fictitious three-dimensional representation that gave the number of its installations. With one simple glance, the reader could see the differences—quantitative and qualitative—within the city. However, at the level of detail, the problems with the map were numerous and sometimes unsolvable, even if they varied from one ‘sector’ to another. Here, I will approach the issue on a general level, trying to highlight the changes, successes, and failures that have shaped the interpretative process over the course of the past thirty years, since the 1980s.

²⁸ Monteix (2010b: pl. h.t. IV).

From Material Remains to Interpretation

At least since the latest synthetic discussion of the issue of production, if not since the late nineteenth century, Pompeii's spaces of production have implicitly been defined as workshops with masonry remains of permanent installations. In practice, interpretations have generally been based upon the broad identification of such installations, without analysing the evidence in any great detail. Moreover, it has been traditional in Pompeian scholarship to refer to these workshops with Latin labels that were supposed to link the archaeological remains to literary texts. From the late 1990s onwards, scholars have generally tried to refine the descriptions of the material remains in order to see the variations between individual workshops, but also to get rid of the traditional but inadequate Latin terminology.

After having been a hotly debated issue in Pompeian studies for a long time, the study of food shops—generally defined as shops having a masonry counter often equipped with *dolia*—appears to have left the debate about Latin terminology behind it. With few exceptions, scholars who truly read the pioneering work of Tönnies Kleberg have now accepted it and agree that the word 'thermopolium' should rank among the philological misinterpretations of the nineteenth century; they have stopped using it to label Pompeian shops and, more importantly, no longer base their subsequent interpretations on it.²⁹ The situation is a bit more complex regarding the use of *popina* and *caupona*: the first term remains essentially used in literary contexts only, and with a variety of meanings, while the second is attested in Pompeian epigraphy; if one really has to use a Latin label, however inconvenient might it be, one should therefore use the latter.³⁰ The bakeries, easily identifiable because of their bread oven, have suffered less from the application of erroneous terminology; there is only the qualification *dulciarius* which Giuseppe Fiorelli—without clear arguments—proposed for some of these workshops, and which was subsequently followed by Betty Jo Mayeske.³¹ Whether the qualification has been based on the presence of large numbers of so-called *forme di pasticceria*—a modern name given to bronze containers of unknown function—or on the absence of mills, it does not relate to any specific property of the work equipment, and its use should therefore be abandoned.³²

²⁹ Kleberg (1957: 24–5). La Torre (1988: 92) created quite a mess when he both referred to Kleberg *and* continued to count 'thermopolia'. Among his recent epigones who continue to use the term, I will only mention Maratini (2011: 169) in the context of a list that unfortunately remains important.

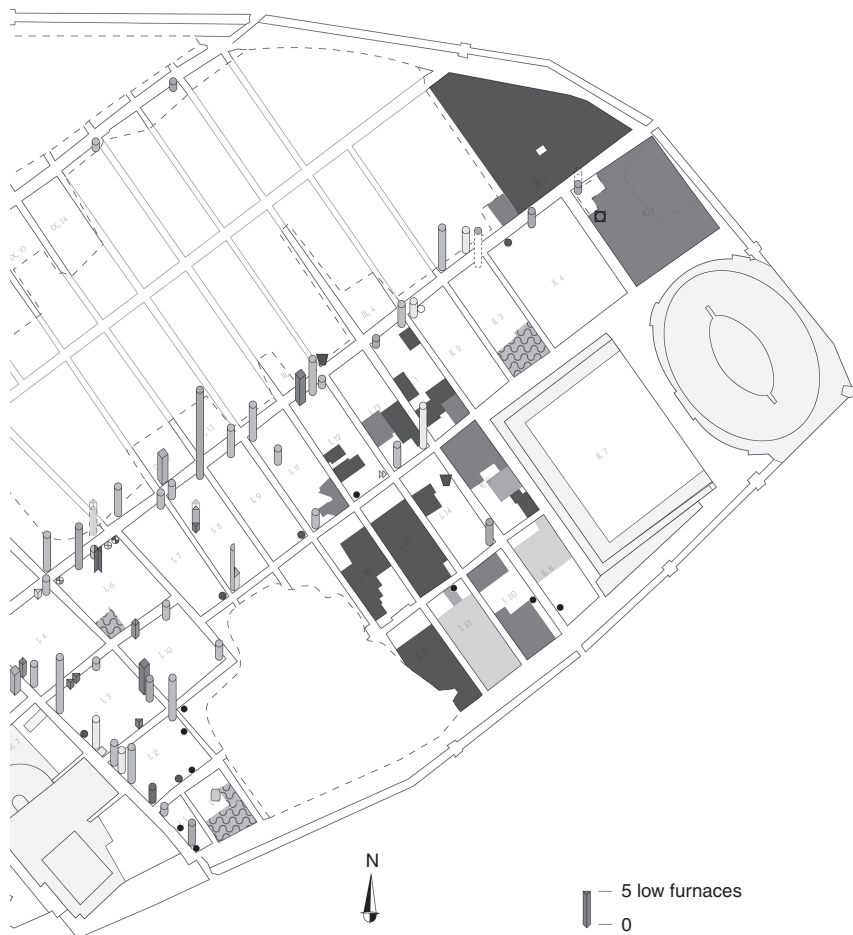
³⁰ Ellis (2004a: 371–2) prefers to use the modern term 'bar', but see Monteix (2007).

³¹ Fiorelli (1873: 18, 68); Mayeske (1972: 98); La Torre (1988: 84).

³² On the term *forme di pasticceria* see Allison (1999: 66–7); on the inadequacy of the term *pistrinum dulciarium* cf. Monteix (2010b: 162–5).



Figure 7.2 Distribution of productive spaces 'in AD 79'/known productive spaces after the exhumation of Pompeii. Map: Nicolas Monteix.



- | | |
|---|---|
| <ul style="list-style-type: none"> 5 hand-mills 0 5 'Pompeian' mills 0 Type a (Mill-bakery with shop) Type a1 (Bakery with shop) Type b (Mill-bakery) Type b1 (bakery) Iron workshop Bronze workshop Lead workshop | <ul style="list-style-type: none"> 5 low furnaces 0 5 fulling stalls 0 mordant vat fermentation dyeing vat 5 dyeing vats 0 Fleece washing workshop Possible fleece washing workshop Dyeing workshop Fullery with rinsing complex Fullery with none / one rinsing basin |
|---|---|

In the textile sector, the work of Philippe Borgard on the archaeological remains of the dyeing workshops of Pompeii has allowed him to determine the functions of the different cauldrons present in these establishments. Thus, in cases where the boilers are arranged in groups of three, the presence of a fourth boiler, larger and isolated from the others, refers to dyeing with a mordant, possibly alum. Sometimes, these installations are equipped with a cone-shaped cauldron facilitating dyeing through fermentation. However, groups of two or three cauldrons without the larger boiler are related to the re-dyeing of used textiles.³³ While it is remarkable that a corresponding Latin terminology—distinguishing between *infectores* and *offectores* respectively—has been identified, this is an exceptional case.

A renewed interest in the study of fulleries, particularly by Miko Flohr, has made it possible to understand better the equipment of these workshops, and to distinguish, at Pompeii, between small and medium-sized workshops based on the installations they were equipped with, including the number of fulling stalls, the number and size of rinsing basins, the presence of a press, and other equipment.³⁴ While there is some consensus about the fulleries, there still is debate about the so-called *officinae lanifricariae*: for some, these workshops were related to fleece-washing and, thus, to textile production, while others contest this identification.³⁵ The textile economy will be further discussed in the section on invisible production.

The processes of building and painting stand in marked contrast with the examples discussed up to this point: while the latter were studied through their means of production, and while it is only rarely possible to study the final product of these workshops, for building and painting only the product is known, and it is impossible, except in one case, to identify the material remains of a permanent workshop.³⁶ For construction and painting alike, specialists no longer try to study the final products for their own merit, but rather to understand issues like technological transformations and the nature of the ties between customer and craftsman.³⁷

Nevertheless, a good understanding of production processes remains an indispensable key phase in the interpretative process. For example, a detailed examination of the tannery that was functioning at the moment of the eruption (I 5, 2) has made it possible to make sense of the circular vats from the period between the second half of the second century BC and the Augustan period that

³³ Borgard and Puybaret (2004: 52–7).

³⁴ Monteix (2010b: 192–205, 211–13); Flohr (2013a: 96–163).

³⁵ The debate has recently been reinvigorated by Miko Flohr (2013b: 57–60), who denies their integration into the textile sector, and the present author (2013: 78–86), who argues that these workshops served to wash raw wool.

³⁶ The exception is made by I 9, 9, the probable seat of a workshop of easel painters; cf. Tuffreau-Libre et al. (2004); Borgard et al. (2005: 315–17); Tuffreau-Libre (2007).

³⁷ On construction see Dessales (2011). On decoration see Esposito (2009; 2011).

were discovered in building VIII 7, 10.³⁸ Indeed, conversely, too loose a definition of identification criteria can lead to interpretations on too shallow a basis, as in the case of the fish-salting vats that supposedly were in use in part of the city before the Augustan period: here, the criteria used for identification were exclusively morphological and as no significant quantities of fish bones have been discovered, the actual use of the vats remains uncertain.³⁹

Counting Workshops and Quantifying Production

The next step in reconstructing urban production at Pompeii would be to evaluate the number of workshops for each production process. Counting workshops is, however, complicated by the state of their remains and by our limited understanding of them; it is also impeded by the often incomplete character of inventories in archives and in earlier literature. For example, there are considerable variations in the number of fleece-washing establishments between publications (Figure 7.3). At the same time, even when scholars agree on the total amount of a certain type of establishment, there can be differences

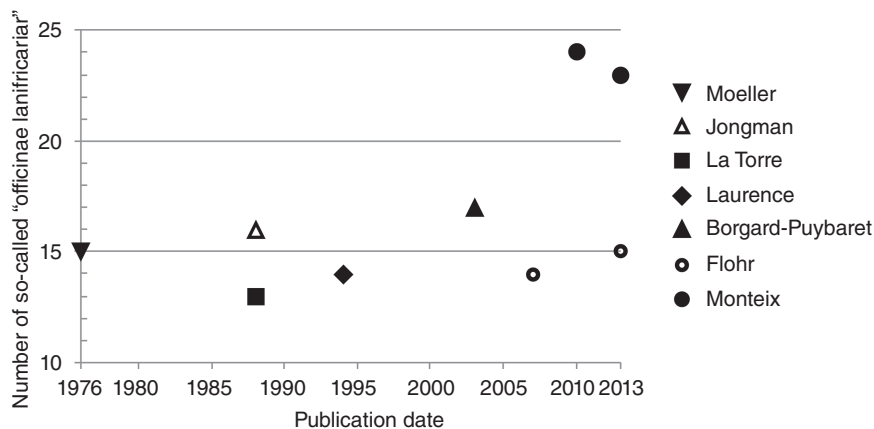


Figure 7.3 Variations in counting so-called *officinae lanificariae*. Chart: Nicolas Monteix.

³⁸ On the interpretation of tanneries see Leguilloux (2002; 2004; 2008). For tannery VIII 7, 10 cf. Ellis and Devore (2008: 9–10).

³⁹ For a synthesis of the installations related to salted fish production see Botte (2009: 99–105). On the interpretation of some vats as fish-salting installations see Ellis (2011: 61–7, 71–2). Some of the examples listed still remain to be excavated (e.g. I 12, 3). In the absence of a detailed publication, only the vat in VI 1, 14–16.21 may actually have been used for fish-salting, provided that one can extrapolate from the one sea bream discovered in connection with it. Cf. Jones and Robinson (2005: 271).

in underlying typologies. For example, scholars have, in recent years, agreed on the number of food shops: including all counters that could have had a function connected with the preparation of food or drink leads to a number of 158 establishments *intra muros*. This figure masks, however, the fact that scholars have used two distinct typologies, each founded on the presence or absence of certain installations in the shops studied.⁴⁰ Yet when they are not connected to problems of interpretation, these variations have only a minimal influence on the general picture of the economy of the city.

To study the output of a workshop in an ideal manner, one should be able to have access to both the remains of the working space and the finished products, whatever their distribution might be. Such conditions never appear, neither at Pompeii nor elsewhere. Even for ceramics, though it is now possible to distinguish between ‘Campanian’ and ‘Pompeian’ production through analysis of the clay, the situation is problematic: for several classes of ceramic objects—amphorae, sigillata, cookware—it is possible to identify products as ‘Pompeian’, and their production in the area is undisputed, but the workshops remain unknown.⁴¹ The two workshops that are currently known to have been functioning in the last years before the eruption specialized in the production of oil lamps and fine wares, but their products, as far as they are currently in the Pompeian depots, still need to be investigated.⁴²

In trying to move beyond the mere counting of establishments—an imperfect strategy in every respect—some scholars have proposed an approach that aims to reconstruct quantitative estimates for the output of workshops. This involves defining which of the installations in a workshop would possibly be indicative of the output of the production process. Counting or measuring this crucial installation would then give an idea of the relative productivity, making it possible to draw comparisons within the site or with other sites, in the absence of any possibility of giving an indication of the absolute productivity.⁴³

However, while this in itself is a useful approach, it presents inevitable limits, particularly at Pompeii. For instance—to show the complexity of the issue—in the case of shops with masonry counters, it is possible to count the vessels embedded in them, and to use this as a basis to compare the size, and potentially the productivity, of food shops, assuming they contained mostly

⁴⁰ To arrive at a number of 158 establishments, shop I 2, 25 needs to be added to the list previously published by me (2010b: 113–27). Ellis’ type a (2004a: 374–5) includes types 1, 2, 4, and 5 proposed by me; his type b corresponds to my type 3; his type c (not identifiable) can correspond to my type 6 (non-food retail). Without entering into the detail, our results correspond to approximately 75%.

⁴¹ On the issue of clay, one refers to the two extremities of the bibliography: Zevi and Tchernia (1972); McKenzie-Clark (2012).

⁴² On workshop I 20, 1 cf. Cerulli Irelli (1977); Peña and McCallum (2009: 64–72). On the atelier outside Porta Ercolano compare the conjectures of Peña and McCallum (2009) with the results published by Cavassa, Lemaire, and Piffeteau (2013); Cavassa et al. (2014).

⁴³ See the cautious remarks of Flohr (2013a: 75–6) about this quantitative approach.

dry foodstuffs in bulk.⁴⁴ Though the image that emerges from such a count is impressive and seems to authorize the comparison between the storage capacities of these shops, it is misleading—not to say partially false. To understand why this is the case, it suffices to look at the four vessels embedded in the counter of the so-called Thermopolium of Asellina (IX 11, 2): three of these are real *dolia* and have a total volume of 230 litres, but the fourth is a much smaller vessel with a volume of 28 litres—the equivalent of one amphora. Unlike the *dolia*, it might also have contained liquids. Until an exhaustive study of these vessels has been conducted and it is possible to discuss this issue on the basis of the volume and the nature of stored goods, instead of only on the basis of the number of vases, one has to remain cautious.

Criteria to evaluate the production capacity of fulleries are more varied than in the case of food shops: besides counting the fulling stalls, one can consider the presence or absence of rinsing basins, and of a shop. On this basis, Flohr has been able to qualify the demand for fulling, and, particularly using the last criterion, to discuss the relation of the fulleries to processes of textile manufacturing that preceded retail.⁴⁵ Of the twelve fulleries excavated at Pompeii, only two could not have served a private clientele, and instead were integrated into the process of textile production: VI 8, 20–21.2 and VI 16, 3–4.⁴⁶ Interestingly, the second fullery presents vertical integration within one workshop: both fulling and wool-processing took place there, while a large area appears to have been unoccupied and may have hosted weaving.⁴⁷

Despite the evident interest in every observation that allows us to rethink our view on the world of work in Roman antiquity, it is important to temper our expectations, particularly in the Pompeian context. The example of the bakeries is especially illuminating. Leaving aside the workshops devoted solely to the preparation and the baking of bread—that is, only considering those that had mills—it would be possible to distinguish variations in the milling capacities of bakeries and, thus, to extrapolate relative production capacities on that basis. At the same time, starting from the distinction between workshops with mills and those without, it would also be possible to study the distribution of bakeries over the city.⁴⁸ However, in the current state of our knowledge, the results from such analyses would present a rather idealized and problematic picture of bread production. A first problem is related to the supposition that the capacity of the mills was always exploited to the maximum. At the same time, the existence of bakeries without mills presupposes

⁴⁴ On this question see Packer (1978: 47–8); Ellis (2004b: 47–8); Monteix (2010b: 102–13).

⁴⁵ Flohr (2013a: 57–95; 2013b: 62–3). ⁴⁶ Monteix (2010b: 202); Flohr (2013a).

⁴⁷ Cf. the section on invisible production on the impossibility of identifying textile production in the later first century AD.

⁴⁸ E.g. La Torre (1988: 84); Laurence (1994: 55–7); Flohr (2007: 132–3); Monteix (2010a: 150–3).

that some mill bakeries had a higher output than others, so that they could produce a surplus of flour that then could be sold to bakeries without milling facilities.⁴⁹ Finally, a third issue that should be emphasized is that the picture of unchanging stability that is suggested in this way is in fact erroneous. Indeed, some of the forty establishments with ovens or mills were inactive at the moment of the eruption, others were heading for dismantlement, and yet others were still under construction, which may partially have impeded the production process.⁵⁰ The same problem emerges when studying the food shops, of which some had been dismantled preceding an eventual restoration.⁵¹ While this sounds contradictory, it is thus the exceptionally detailed precision of the Pompeian record that obstructs analyses on a more general level, and that, as a consequence, reduces the significance of Pompeii as an exemplary site.

Invisible Production

Because of the biases involved in studying the evidence, the picture that we have of urban production at Pompeii thus appears highly problematic. Besides this, however, it is also essential to highlight the gaps in our knowledge, resulting from lack of evidence or from the underexploitation of known data: part of the manufacturing economy of Pompeii remains invisible to us at this very moment.

The first, and certainly the most paradoxical, example of this concerns textile production. Despite its central position in the historiographical debates about the Pompeian economy since the 1960s and 1970s, a simple fact needs to be hammered in: the manufacturing of textiles—weaving and the activities associated with it—cannot possibly be fully understood at Pompeii: both the domestic or professional contexts in which manufacturing took place, and the quantities of textiles that were produced, elude us.⁵² A study focusing on

⁴⁹ Mayeske (1972: 82–135) and her followers (e.g. La Torre [1988: 84]) suppose, without clearly defined criteria, the existence of *pistrina dulciaria*, of which some did not have mills; Flohr (2007: 131–2) makes a distinction between bakeries (with mills) and bake shops (without mills) without proposing a functional interpretation. The absence of mills is the only difference between these two types of bakeries. The other installations are comparable. The surplus production of the mill bakeries enabling the provision of flour to bakeries without mills remains the most credible hypothesis. For a discussion of the different types of bakeries cf. Monteix (2010b: 162–6).

⁵⁰ Bakery VII 1, 36–7, where, on excavation, eighty-one loaves were discovered within the oven, seems to have been undergoing renovations at the moment of the eruption. Conversely, bakery I 3, 27 seems to have been in the process of being dismantled. Cf. Monteix et al. (2015).

⁵¹ The food shop I 9, 11 was discovered in a state in which its non-functioning in 79 AD is highly probable. It would have been under reconstruction. Cf. Berry (1997a: 121–2).

⁵² For the debate about textile production at Pompeii see Moeller (1976: 72–82); Jongman (1988: 155–87); Flohr (2013b: 66–7).



Figure 7.4 Pompeii, 1973. Sheep grazing at Porta Vesuvio (Photo Fr. Pauvarel/courtesy Soprintendenza archeologica di Pompei, Ercolano e Stabia).

the raw materials would not help us any further: while we could discuss their provenance and reconstruct estimates of the quantity that was at the producers' disposal, the exact details would still remain invisible, partially because of the evasive and moveable nature of such processes (Figure 7.4).⁵³ Spinning could possibly be made visible through an inventory of spindles and spindle whorls and through a reassessment of a couple of graffiti of which the interpretation remains unclear, but this work still needs to be undertaken.⁵⁴ As far as weaving is concerned we cannot in fact reconstruct a reliable estimate of the output. Through an inventory of the location of groups of lead loom weights, it has been possible to identify sixteen warp-weighted looms; ceramic loom weights have been too badly inventoried to allow for the localization of assemblages indicating a loom. Problematically, the general evolution of weaving technology suggests that, in the course of the first century AD, the warp-weighted loom was progressively replaced by the two-beam vertical loom. This type of loom consisted completely of wood, and only leaves traces under exceptional circumstances—an example has been attested at Herculaneum.⁵⁵ It thus has to be accepted that there is a cul-de-sac in the study of the textile sector: the production of cloth at Pompeii is invisible and cannot be understood, neither quantitatively nor qualitatively, as there are no data to study.⁵⁶

⁵³ For examples of sheep pens in Gallia Narbonensis, cf. Congès (1997).

⁵⁴ Monteix (2010b: 175–6).

⁵⁵ On weaving in Herculaneum and Pompeii see Monteix (2010b: 176–85). On looms, see Wild (2008: 470–2); Ciszuk and Hammarlund (2008).

⁵⁶ Monteix (2013: 87).

Table 7.1 Comparison of a selection of productive spaces between ‘AD 79’ Pompeii and first-century AD Switzerland

	Metallurgy			Tannery	Bakery	Fullery
	forges	copper alloys	lead			
Pompeii	4 7%	1 2%	3 5%	1 2%	35 61%	13 23%
Switzerland (1st c. AD)	68 61%	28 25%	0 0%	8 7%	4 4%	4 4%

Data: N. Monteix; Amrein et al. (2012).

At the same time, however, it makes sense to ask an almost naïve question: Is it likely that the inhabitants of Pompeii were wearing only textiles that were dyed and cleaned by them but woven elsewhere, while, at the same time, they were producing leather, drinking their own wine, and perfuming themselves with their own oil? Except for someone looking at the map of productive activities identified at Pompeii (Figure 7.2), the answer should be negative. The point can, first and foremost, be illustrated by considering the workshops involved in metal-working. In any other ‘normal’ city, iron-working is the activity that can be most frequently recognized, but only four iron smithies can be identified at Pompeii, and only one workshop involved in bronze-working and three workshops that specialized in lead-working.⁵⁷ A comparison with the distribution of comparable workshops identified in the area of what is now Switzerland is enlightening in this respect (Table 7.1). Despite the evident difference in scale between both datasets, the mixed character of the Swiss evidence both geographically—a mix of cities, small towns, vici, rural sites, and military contexts—and chronologically—an ensemble of the first century AD—and despite the probable intrinsic differences in the productive landscape of the two contexts, the picture at Pompeii appears distorted: while the metal workshops dominate the evidence in the Swiss dataset, they are marginal in the Pompeian evidence as we perceive it.⁵⁸ It is therefore probable that metal-working establishments—eight workshops in a total of 882 commercial spaces identified within the walls is less than 1 per cent—at Pompeii are underrepresented. This is probably due to a lack of interest in their installations

⁵⁷ On iron-working at Pompeii cf. Amarger and Brun (2007); Amarger (2009); on the working of bronze alloys, cf. Gralfs (1988). On the lead-working establishments see Monteix and Rosso (2008). As far as the questions of specialization in one metal or another is concerned, see the remarks of Pernot (2011).

⁵⁸ The data come from Amrein et al. (2012). The chart reproduced here evidently is not representative of the totality of evidence known in the area of modern Switzerland: the selection used here serves to allow for a rapid comparison. It is useful to keep in mind that some of the Swiss sites have only partially been excavated, which makes it impossible to continue the comparison beyond counting.

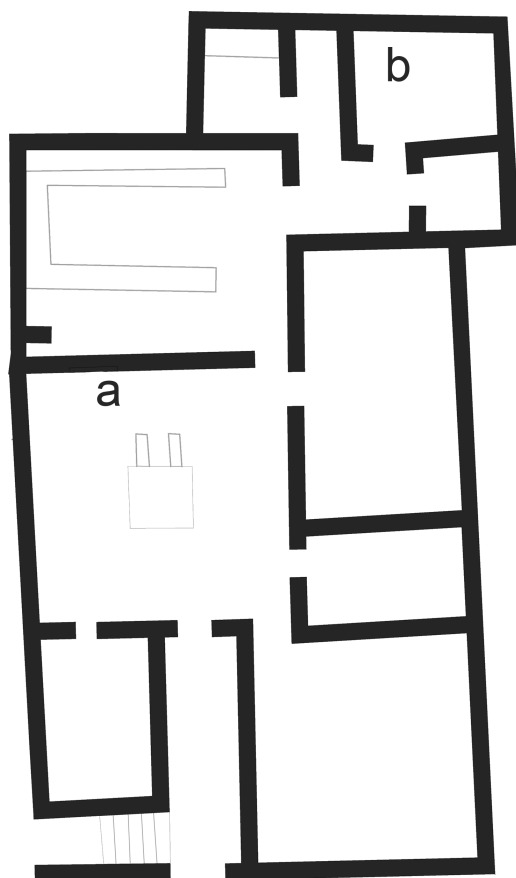


Figure 7.5 House I 8, 14, with the two find locations of tool sets. Plan: Nicolas Monteix.

by several generations of excavators. It is, in this case, improbable that even a thorough study of the archives can change this situation radically.

Conversely, other places of production, which remain invisible because they tend to lack masonry installations, can be identified through the study of utensils that belonged to the personal outfit of craftsmen.⁵⁹ This, for example, is the case in house I 8, 14, where the remains visible on site do not show any traces of economic activities (Figure 7.5; Table 7.2). However, two series of utensils, found concentrated in the atrium and in an adjacent room, show a specialization that makes it possible to identify the activity that took place here

⁵⁹ The Casa del Fabbro (I 10, 7) is a first example of a place where a productive function can be identified—the production of wooden furniture—in three rooms of a house where no visible evidence remains. Monteix (2011: 17–23); *contra* Allison (2006: 337–49, esp. 348–9).

Table 7.2 Overview of tools found in the atrium and room 9 of house I 8, 14

	Hoof knives	Shears	Cutters	Total
Atrium (a)	5	2	23	30
Room 9 (b)	2	5	13	20
Total	7	7	36	50

(Figure 7.6).⁶⁰ They can be divided into three types: scalpels, hoof knives, and large scissors that had blades measuring 18–20 cm and were equipped with a bronze spring. The blades of the scalpels and hoof knives were made of iron, while the handle was made of a worked copper alloy. When the blade is preserved, it generally presents the form of a half-moon, on the axis of the handle or at a right angle to it. The handles are finely decorated with a cupid, Hercules, or the head of a horse. The hoof knives are characterized by a blade 25 cm long and 6 cm wide, with the sharp side at the far end. The blade has been inserted in the handle through pinching and fixed through riveting. The handle always represents the head of a horse, and has an anthropomorphic end in the form of a female figure.

The prominent role of horses in the decoration of these instruments suggests an activity related to these animals; the scalpels, and also the very large scissors, indicate a cutting activity, probably of leather. It seems thus possible to suggest that the craftsmen who left their instruments in this house were actually saddle-makers, who stretched their profession—with respect to its modern definition—also to include the care of horses.⁶¹ The instruments seem to form several sets, each consisting of a pair of scissors, a hoof knife, and a varying number of scalpels. If this is true, it is possible to count seven people working in house I 8, 14. Thus, thanks to the preserved equipment, it is possible to reconstruct the presence of a group of urban saddle-makers that had installed themselves in a small Pompeian house. This raises the question of how many other workshops that did not have any masonry equipment still remain to be studied in the archives to further our understanding of the manufacturing landscape of Pompeii.⁶²

⁶⁰ The first series comes from room 9 (inv. no. 6545–57, 6554, 6567 [15 April 1938]), the second from atrium 2 (inv. no. 7369, 7371, 7375–80, 7382 [31 May 1941]). Moreover, pairs of scissors have been found in room 3 (six pairs, inv. no. 7408 [9 June 1941]) and room 4 (seven pairs, inv. no. 7566–78 [12 July 1941]).

⁶¹ The discovery, in the atrium, of various elements of horse harness, particularly bits (21 April 1941), and the remains of a wheel with a diameter of 1.3 m (inv. no. 7390, 4 April 1941), provide additional evidence for this hypothesis, but see Berry (1997b).

⁶² Given that the only masonry element is the soaking basin resembling a gutter, would house I 14, 2 have been interpreted as the workshop of a basket-maker without the initial discovery of bundles of plant remains stored in a room? Cf. Cullin-Mingaud (2010: 129–71).

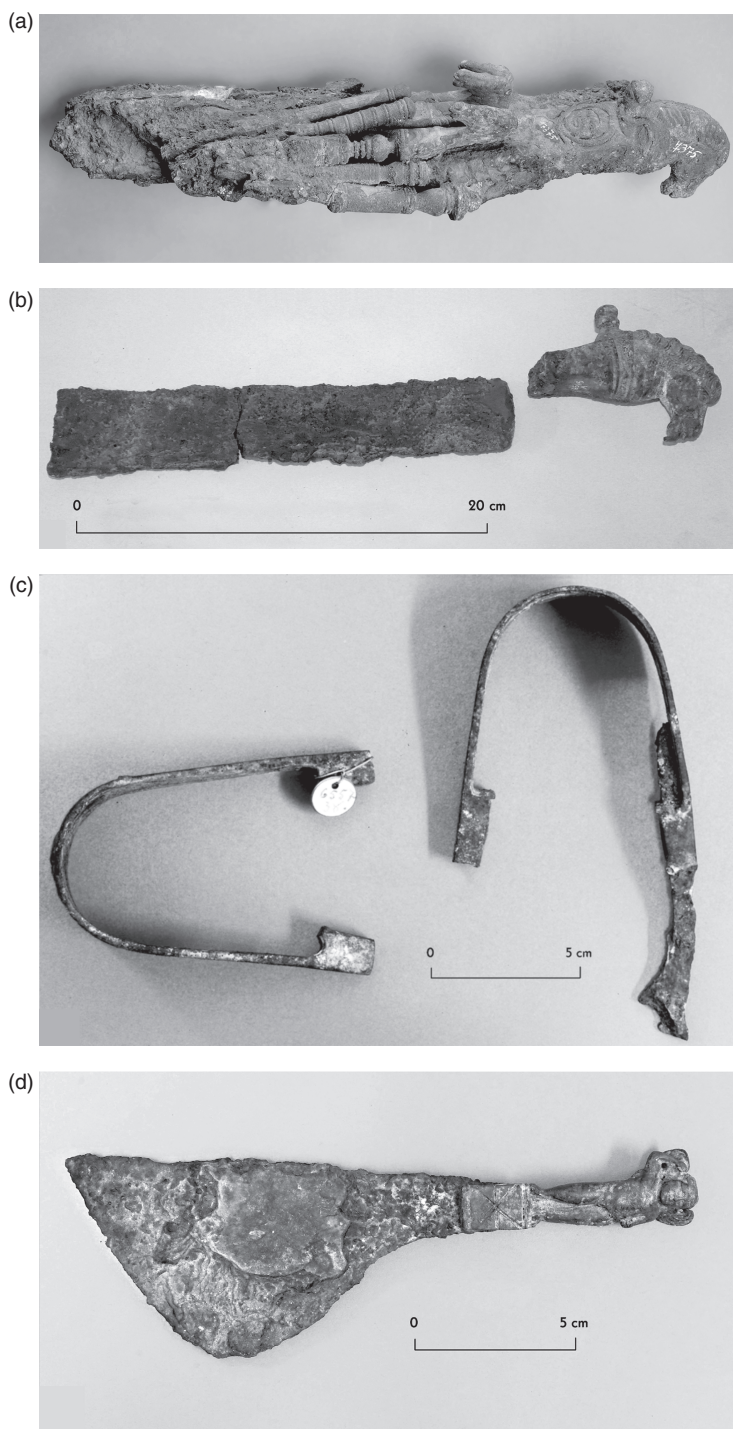


Figure 7.6 Tool sets found in I 8, 14: (a) set of tools fused together by corrosion (inv. no. 7375); (b) hoof knife (inv. no. 6545A); (c) shears (inv. no. 6557); (d) cutter (inv. no. 6552) (Photo (a): Chr. Durand/CNRS-CCJ; all courtesy Soprintendenza archeologica di Pompei, Ercolano e Stabia; Photos (b)–(d): N. Monteix).

To conclude, quantifying manufacturing structures does not produce historically meaningful results, and the picture of the productive landscape obtained in this way remains partial and limited: only a small number of workshop types are being studied, and, generally, workshop types are studied in isolation, without any attention paid to the evident interaction that they enjoyed with other establishments, whether they belonged to the same sector of the urban economy or not.

ALTERNATIVE APPROACHES TO URBAN PRODUCTION

Nevertheless, together, the sectors that can be studied should be paradigmatic for the Pompeian manufacturing economy in its entirety. Indeed, what looks like a cul-de-sac needs to be explored, if only to become aware of the limits of the possible. If approaches focusing on quantifying production lead us nowhere, there are other roads that can be taken in order to understand the role of manufacturing in the functioning of the urban economy. The following pages will highlight three possible approaches, whose value still remains to be evaluated. They basically come from two priorities: on the one hand, the need to increase the level of specific understanding of each economic activity identified at Pompeii; on the other, the desire to escape from the preoccupation with quantification by moving towards a more integrated picture of manufacturing in the urban economy—accepting the risk that such a picture would be more generic.

Documentary Exercises

The first priority, though it seems to be the more easily accomplished, requires in fact an effort that is both substantial and unrewarding. It also goes significantly beyond the mere study of manufacturing, as it concerns nothing less than to complete, finally, the ‘era of documentation’ that started in 1980 with *Pompei 1748–1980. I tempi della documentazione*, an exhibition where several documentation projects were presented, including the series *Häuser in Pompeji*, the study of insula I 10, and the city-wide cataloguing of wall decoration that resulted in the *Pompeii. Pitture e Mosaici* series.⁶³ Thirty-five years later, some projects still have only been partially completed, and there are still considerable gaps in the way the Pompeian evidence has been documented

⁶³ Zevi (1981); Strocka (1981); Ling (1981); Parise Badoni (1981).

and published. Indeed, it has to be admitted that the core of scholarly thinking about Pompeii has generally been founded upon a small and incomplete evidential basis, which is continuously being recycled, and that not a single building has been published in a way that satisfies modern standards—bringing together a transcription of the excavation archives, descriptions of standing remains, and detailed drawings of the discovered materials.⁶⁴ Our insight into Pompeii's economy suffers from this situation. To give just one example, there is, at this point, no study focusing on the tableware discovered in food shops, even though such a study would help us to understand essential details of the shops' economic functioning. Even the publication of work on the best known of these establishments, the so-called tavern of Asellina (IX 11, 2) is incomplete, and, as it lacks drawings, does not correspond to the modern standards of archaeological documentation.⁶⁵ Most of its shortcomings have to do with problems with the inventorying of objects mentioned.⁶⁶ Indeed, as recent work on Pompeii's *fullonicae* has made clear, a simple surface cleaning of workshops can lead to a better understanding of the work installations used in the production process.⁶⁷ Such a detailed documentary exercise, if extended to all manufacturing sectors, would make it possible really to analyse, for instance, the spatial impact of manufacturing activities on space so that their expansion can be understood beyond often reductionist spatial typologies.⁶⁸

Understanding the Urban Property Market

On this improved documentary basis, it would also become possible to develop reflections on the role of manufacturing in the urban economy in general, instead of limiting oneself to a narrow sectorial subdivision. A key approach in this respect would be to discuss the importance of production from an investment perspective, employing the surface used for commercial activities as the main (though not the only) unit of analysis. This approach has been tested at Herculaneum, but it needs to be developed further, in order, at least, to allow comparison not only between the Vesuvian cities but

⁶⁴ The publication of insula I 10 comes closest to this standard, despite the lack of a verbatim publication of the excavation archives. Ling (1997); Ling and Ling (2005); Allison (2006); Painter (2001).

⁶⁵ The most complete catalogue remains exclusively based on photographs and includes several errors: Stefani (2005).

⁶⁶ One compares the number of objects discovered in the so-called Thermopolium of Asellina (eighty-eight, not including amphorae), with those discovered in I 10, 13 (twenty-nine, cf. Allison [2006: 248–50]).

⁶⁷ Flohr (2013a: 96–163, plans 11–17, 19–21).

⁶⁸ Calabrò (2012) develops interesting approaches in this direction for food shops.

also between cities throughout the Roman Empire.⁶⁹ It is based on certain presuppositions that cannot be ignored. The first presupposition concerns the existence of a property 'market', which involves the assumption that there were properties whose value could fluctuate as a result of intrinsic and extrinsic factors.⁷⁰ This is not the place to discuss all theoretical and practical aspects related to the existence of Roman property markets; it suffices to say that, at least theoretically, it seems possible to reconstruct a partial picture of the manufacturing economy by looking at urban investment by elite proprietors.⁷¹ However, to do this in practice, the first step would be to reconstruct the juridical limits of properties, indeed of a property portfolio, which, in the absence of any epigraphic evidence, seems impossible beyond the level of hypothesis.⁷² Nevertheless, it is possible to develop hypotheses on the level of individual buildings by reconstructing the ties of dependence between the different parts of a building; from these ties of dependence, economic ties can then be inferred. This process also involves investigating whether certain parts of a building possibly could be rented out—either as a commercial unit, or as a residential unit, or as one incorporating both functions.⁷³ It then becomes possible to characterize buildings (and their constituent parts) according to whether they were rented out and belonged to an owner distinct from the occupant, or whether they were occupied and eventually exploited by the owner. In this way, the different forms of economic investment in the city can be analysed, and, as far as excavation or the study of the standing remains reveals the historical development of buildings, their evolution can be followed. At this stage, the main difficulty is to build up a picture that is as complete and as diachronic as possible, which includes resolving certain questions related to a possible increase in commercial space at the expense of domestic space. Above all, it is essential to find a way to integrate upper floors in this picture, despite the difficulties of studying them in an equal

⁶⁹ Monteix (2010b: 349–70).

⁷⁰ On the existence of such a market, both sale and rental, in classical Greece, cf. Nevett (2000).

⁷¹ Since the article of Garnsey (1976), the studies of economic history focusing on this question have been dispersed and few. See, however, Dubouloz (2011: 157–200) for a juridical approach and Guilhembet (forthcoming) concerning the example of Roman houses.

⁷² Several attempts to reconstruct property limits have been proposed at Pompeii for insula I 10 (Ling [1997: 361–3]) or at Herculaneum for the north half of insula V (Wallace-Hadrill [1994: 132]; Pirson [1999: 70–4]; Monteix [2010b: 361–3]). Even with the aid of epigraphy, the construction of property belonging to one person is arduous, lacunose, and strongly hypothetical (Monteix [2014]). The only context allowing to bridge the gap between epigraphy and archaeology is made up by insula VI 6, on the façade of which the inscription *CIL* 4.138 has been read. The variations in the interpretation remain considerable. Cf. De Albentis (1989); Pirson (1999: 23–47); Dubouloz (2011: 183–6).

⁷³ This involves applying criteria concerning autonomy and belonging to another property unit. In his definition of criteria for identifying rental property, Pirson (1999: 53–84) includes habitability, which is less relevant when discussing commercial property.

manner throughout Pompeii; although it seems, a priori, less probable that manufacturing took place there, limiting the analysis to the ground level may obscure an extension of the inhabitable surface on upper floors, as has been observed for Herculaneum in the first century AD.⁷⁴ In doing so, the proportion of domestic space is artificially reduced.⁷⁵

It is evident that the different assumptions made here tend to smooth away interpretative problems in situations where the complexity escapes us and cannot be reconstructed in detail because the evidence is lacking. This is, however, a conscious smoothing that is as contained as possible, and which, in return, makes it possible to give Pompeii an equal treatment to that of sites that are less well preserved. Thus, it allows and facilitates comparisons between cities in the whole empire that may help us to understand the role of production and commerce in economic investment in a diachronic way.

Système Technique

Another possible approach to manufacturing at Pompeii would start from the concept of the *système technique*, as defined by Bertrand Gille.⁷⁶ The *système technique* integrates the economic ties that surround workshops; it can be seen as a reconstruction of the totality of manufacturing activities and their economic ties at a given moment. A first step in building up this picture would be to identify the elements necessary for the activity of one specific workshop type. These elements can include raw materials as well as the skills of other more-or-less specialized craftsmen, who can come in at any moment in the life course of the workshop in question, during construction, maintenance, and everyday functioning. The activity of Pompeian bakers can serve as a useful example. In the diagram in Figure 7.7, each of the three circles drawn around the bakery refers to the location of the raw materials and the people working them, distinguishing local, regional, and long-distance provenance; what has been placed on the border between two circles can belong to both. Each arrow represents an exchange that is supposed to be monetary. Besides the inevitable omission of some minor things necessary for the functioning of a bakery—such as the leather belts and the horseshoes that are indispensable for the exploitation of horses as driving force for the mills—and without including simple retailers, there are at least four different crafts directly involved in the

⁷⁴ In a sample of houses in Herculaneum of which one can follow the evolution between the Augustan period and the eruption, the relative proportion of upper floors increased from 31% to 37%, and their total surface increased with 80%, growing from 1,852 m² to 3,312 m². Cf. Monteix (2010b: 353–60).

⁷⁵ On the difficulty of including upper floors in a city-wide analysis see also Chapter 2 (this volume).

⁷⁶ Gille (1979).

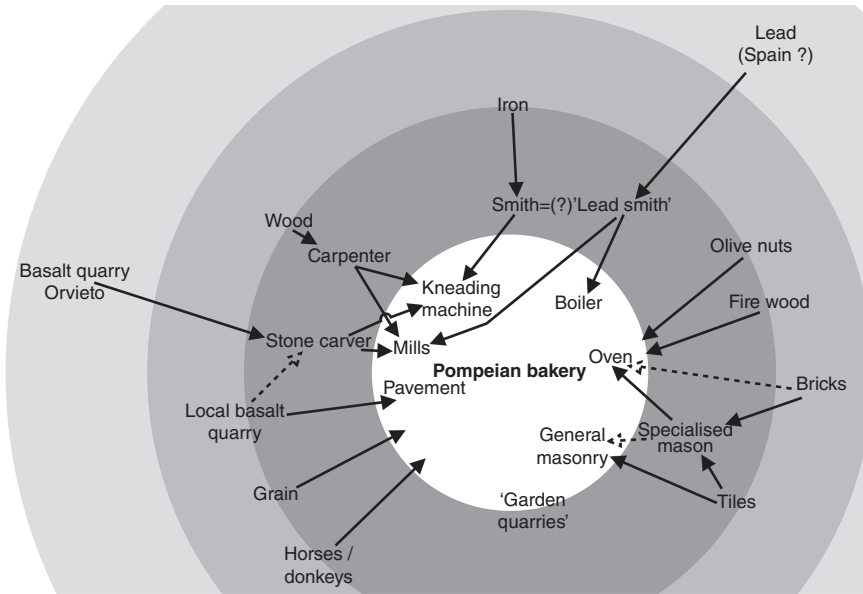


Figure 7.7 Visualization of part of the *système technique* in which a Pompeian bakery was involved. Chart: Nicolas Monteix.

production process of a bakery, including carpentry, stone-dressing, forging, and masonry. The key question, of course, is whether a specialist should be assigned to each task or whether some of the tasks were done by the baker himself. While there are, in Pompeian bakeries, several installations of unorthodox design that suggest the involvement of non-specialists in their construction, it is less clear what should be made, for instance, of the regular maintenance of the *catilli* to preserve a good quality of the milling surface: Did the baker do this himself, or would he have to wait, each time, for a specialized stone dresser to come to do this?

This way of analysing the activities and crafts surrounding a workshop can only rest upon a very precise and specific knowledge of the work that took place there—even though this knowledge is not necessarily a goal in itself. This fosters the development of all kinds of questions that constitute a wide range of research trails.⁷⁷ Multiplying these analyses for other production processes, and combining them into one system, makes it possible to visualize part of the network that is constituted by the entire manufacturing system. This approach would have the notable advantage of fostering the end of the dominance of mono-sectorial approaches to the economy, in which each specialist tends to

⁷⁷ For instance, see E. and S. Deschler-Erb's thoughts on cooperation between crafts in the Swiss ancient productive landscape, in Amrein et al. (2012: 163–8).

define general rules of economic functioning based on a model solely based on the activity that he happens to study—an issue that has seriously affected debates on textile manufacturing. Such an attitude would help gain perspective on changes through comparisons: the isolated position of Pompeii in manufacturing studies as a case study could cease, allowing, in this way, a better understanding of productive processes on an empire-wide level. Moreover, by highlighting the variety of exchanges, even though each of them itself is small in size, this perspective can return scale to the urban economy beyond the opposed models that were in vogue in the past. From this firmly micro-economic angle, it is possible to raise the question of whether it is the sum of all these small-scale exchanges that constitutes one of the key bases for the economic functioning of cities.

EPILOGUE

The preceding remarks should not lead to a definitive conclusion: our current perception of manufacturing at Pompeii, based on almost two hundred years of scholarship, remains open to an unlimited number of developments in the future. However, evaluating urban production at Pompeii in quantitative terms appears to be a road already explored and without perspective, given the lack of quantifiable evidence that would make it possible to do more than just stack up fragile conjectures.

Despite the evident potential of the Pompeian record, the damage done to the city since the first seismic events of the early AD 60s have damaged the supposed 'time capsule' beyond repair. The general context of a 'crisis' of recurrent seismic upheaval that preceded the AD 79 eruption makes the already patchy picture of the city emerging from the volcanic debris even more difficult to understand. Looked at from too close, it supplies many details but prohibits any synthesis; looked at from too far away, it means that each generic statement will be swept away by a series of details. More than anything else, it is important not to look for an ideal point in time at which one might observe the manufacturing system functioning normally and to use observations made in this way as starting points for further analysis. Indeed, as at any other archaeological site, it is more important to focus on understanding the evolution of the manufacturing system over time than to reconstruct it for a specific moment that never really existed. Only by studying the structures of production in the problematic context of their burial does it become possible to reconstruct, at some point, shared characteristics that can be useful for understanding other sites.

Part of the numerous shadowy zones of our knowledge of urban workshops can be illuminated by going back to the original documentation. In this sense,

in-depth studies for each sector of production still need to be conducted throughout the entire city, focusing particularly on issues that might seem to have been understood since the early nineteenth century. Besides leading to an inevitable advance in our understanding of technology—a consequence necessarily following from the more precise description of work installations and instruments—this documentary research will also necessarily feed into debates about economic and social history. Though there will always be gaps in our knowledge that cannot be filled, assessing the importance of urban economies through the evidence for urban manufacturing remains a reachable aim.

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Wealthy Entrepreneurs and the Urban Economy

Insula VI 1 in its Wider Economic Contexts

Damian Robinson

When looking at the role of the elite in the urban economy, there is a curious disjunction in both the sources and their interpretations when trying to understand the economic behaviour of the Pompeian upper classes. Archaeological evidence from the Vesuvian cities illustrates that upper-class houses were surrounded by and often linked to shops, workshops, and rental properties, which attests to a very direct connection between the elites and the urban economy. Yet epigraphic evidence would seem to suggest that the urban economy was almost entirely in the hands of freedmen.¹ This could be taken to suggest that the urban elite simply left trade to the lower classes, perhaps as a result of underlying mores that saw agriculture as the only appropriate economic activity for a gentleman.² Here the words of Cicero in *De Officiis*, ‘trade, if it is on a small scale, should be considered demeaning... there is no kind of gainful employment that is better, more fruitful, more pleasant, and more worthy of a free man than agriculture’,³ have often been used a leitmotif on the sordid nature of urban trade and commerce compared to agriculture. They have also been embraced by many authors intent upon demonstrating the rise of freedmen and ensuing social conflict during the latter years of Pompeii’s life.⁴

On the other hand, the near-contemporary agricultural manuals are full of sage advice to this wealthy landowning sector of society on how to maximize

¹ Mouritsen (2001).

² Cf. Cato, *Agr. Praef.*; Varro, *RR* 2.1–3.

³ Cic. *de Off.* 1.151.

⁴ E.g. Maiuri (1960) is an excellent popular account of this position on elites and trade. See also Maiuri’s (1958) report on his excavations in Herculaneum, where he explicitly socially categorizes properties based on the presence or absence of associated shops and workshops.

production. Cato, for example, recommends that if a villa is 'near a town it is well to have a garden planted with all manner of vegetables and all manner of flowers for garlands',⁵ a sentiment echoed by Columella in his discussion of the planting of grapes, where he suggests that if a property was located close to a town then grapes could be produced for sale in the market in the same way as other fruit crops. He particularly recommends the planting of varieties that are early ripening, that look pleasing to the eye, that have a good flavour, and also keep well in winter.⁶ Clearly the point is that the grape varieties chosen for planting should be marketable, and hence profitable, for as long a season as possible.

In their discussions, the agronomists foreground the economic profitability of the land, and the role of the owner of the property is continually emphasized. This is an entire world away from the supposed timidity of the actions of the landowning aristocracy in the urban economy and, in reality, we must seriously question whether the apparent economic dynamism of this sector of ancient society does indeed stop at the city wall. Such a contradictory picture is, of course, fallacious. Cicero, for example, was himself a landowner in the vicinity of Pompeii,⁷ and for all of his rhetorical bluster in *De Officiis* he also possessed an economic portfolio that included urban shops, workshops, houses, and apartments, to accompany his rural villas and farms.⁸ There are even passages in Cicero's letters to suggest that he also had something of a pragmatic business-orientated approach to the management of his urban properties:

[T]wo of my shops [in Puteoli] have collapsed and the others are showing cracks so that even the mice have moved elsewhere to say nothing of the tenants...

However, there is a building scheme underway, Vestorius advising and instigating, which should turn this loss into a source of profit.⁹

It is within this context, where a celebrated consul of Rome could be both rural farmer and urban entrepreneur, that we should approach Pompeii.

Although the epigraphic evidence does imply that freedmen dominated urban trade, a detailed reading of the agronomists may help us conceptualize the role of the elites and their relationship with freedmen a little more clearly. In the countryside, the agronomists are unambiguous: while freedmen and slaves undertook the bulk of the work, this was done under the auspices of their master. In the countryside, the property owner sets the agricultural agenda and gives orders to be carried out by slaves or freedmen working the land under an overseer.¹⁰ The above quote about Cicero's redevelopment of

⁵ Cato Agr. 7. ⁶ Colum. 3.2.1–4.

⁷ Cic. Att. 21 (2.1.11); 207 (10.15.4); 420 (16.11.6). Plut. Cicero, 8.

⁸ Cf. Griffin and Atkins (1991: xix). Parkins (1995: 30–3).

⁹ Cic. Att. 363 (14.9.1–2). Frier (1978). ¹⁰ Cato Agr. 2; 5.1–6. Varro RR 1.17.2.

his shops in Puteoli shows an identical pattern of behaviour—Cicero sets a direction of work and appoints an overseer for this, he is an active participant in the management of his urban investments in the same way as he actively attends to the needs of his rural properties.¹¹ Obviously, while we should not envision him ‘getting his hands dirty’ in the rebuilding, nor later serving behind the counter of one of his shops, as much as he would never have personally worked the lands on his farms, he was nevertheless in control of their economic destiny.

Consequently it is the aim of this chapter to recast the archaeological evidence for the participation of some of Pompeii’s richest inhabitants in trade and industry in the light of what Cicero and the agronomists tell us, and to suggest that, in all likelihood, wealthy Pompeians of the sort who would have made up the curial elite should be seen as the organizational heart of the urban economy, or at least a large proportion of it. The archaeological evidence for such a reassessment will be mainly drawn from the results of a large-scale excavation and recording project in insula VI 1, a triangular city block in the north-west sector of Pompeii next to the Herculaneum Gate. This detailed research project has enabled the long-term economic history of this city block to be examined and the roles of its successive residents to be interpreted. As will become clear, the richest residents of this *insula* played a major and long-standing role in the development of the Pompeian urban economy. There is evidence of the kinds of bold economic risk-taking and the active management of their investments so evident in the agricultural manuals. Indeed, it will be shown that there is no real difference in the economic attitudes of the elites whether they were in the town or in the countryside; they simply wanted to make money from their investments. Furthermore, the chapter will consider the structural similarities in the design of urban and rural housing, and suggest that the familiar pattern of the *fauces* of the upper-class home surrounded by shops and workshops was an essential element in the display of the fecundity of the owner’s urban landscape, an obvious illustration of their wealth, and a celebration of their key role in production: shops were not something to be ashamed of, or hidden away from sight.

It is a truism to suggest that few of the larger houses are without an obvious connection to the urban economy (Figure 8.1), yet within Pompeian scholarship there has been a reluctance to accept the full ramifications of this, that the division between businessmen and local politician would have been largely artificial.¹² Although work now stresses the role of patronage and the bonds between the elites and their clients that would have brought the upper classes into regular contact with the commercial world, a more conservative view, stressing a dichotomy between the traditional landed aristocracy and trade,

¹¹ Cic. Att. 317 (13.9).

¹² Garnsey (1998: 70 n.21).



Figure 8.1 The frontage of the Casa del Fauno and the economic properties integrated into the Nocera tuff frontage. Photo: Damian Robinson.

often still prevails.¹³ Consequently, to begin with we must take account of this traditional interpretation of the Pompeian economy. In the work of authors such as Amedeo Maiuri, whose interpretative legacy still hangs heavy, the association of shops and workshops with the houses of the urban aristocracy was a relatively late phenomenon. Most commonly, many urban businesses are dated to the period after the earthquake of AD 62/3, which proved a crucial turning point in the economic history of the city. This was a time when the newly emboldened freedman class revolutionized the urban economy; their shops ‘brutally invaded all the available space towards the street; they defaced the simple and severe architectural fronts of patrician houses by plastering garish trade signs on their walls; they pressed against the sides of noble portals as if to launch a final and triumphant attack against the whole edifice’.¹⁴ Echoes of such sentiments are also to be found in more recent literature on Pompeii: ‘New businesses were opening up everywhere as tradesmen benefited from the rebuilding of properties either to incorporate shops and workshops

¹³ Studies that stress the integration of the upper classes and the commercial world include Wallace-Hadrill (1994: 118–41); Parkins (1995; 1997a); Mouritsen (1997; 2001); and Robinson (2005).

¹⁴ Maiuri (1960: 118).

into the periphery of domestic properties, or indeed to convert them entirely for commercial use.¹⁵ In both cases, the catalyst for the economic boom of Pompeii was the earthquake, and the prime movers of this development were lower-class traders. While there were undoubted changes to the urban economy in the last seventeen years of Pompeii's life, in which the freedmen classes certainly played their part, such developments should not be divorced from the city's long-term social and economic history.

THE SECOND-CENTURY BC ECONOMIC BOOM

Stratigraphic excavation throughout Pompeii is revealing increasingly substantive traces of earlier buildings in the city from the Archaic period onwards.¹⁶ In the archaeology of insula VI 1 (Figure 8.2), however, while there are earlier buildings, the most coherent view of the urban economy within this city block can only be traced back to the early years of the tightly packed urban grid system familiar to us today. Across regio VI, the development of housing within the city blocks, or *insulae*, come from the late fourth to third century BC,¹⁷ while, at the north-west edge of regio VI in the 'hinge' insula VI 1, this process took place a little later, around 200 BC.¹⁸ In order to lay out the new city block, several pre-existing structures were demolished, alongside terracing and the division of the *insula* into different building plots. This was followed by the initial phase of the Casa del Chirurgo and a little while later by the Casa delle Vestali.¹⁹ Neither of these properties had any associated economic space at the time of their initial construction, and indeed the Casa del Chirurgo only 'succumbed' to the 'invasion' of the urban economy sometime in the late first century BC, when two shops were carved out from the main body of the property (VI 1, 9 and 11).²⁰

Such a late date for the development of shops in the Casa del Chirurgo could easily be meshed with the rather apocalyptic visions of social change encompassed by the late economization paradigm, but such a tale would present a false vision of the economic development of this particular city block and the role played by its richest inhabitants. The neighbouring Casa delle Vestali presents a rather different picture and one that is more in keeping with the general economic development of the remainder of the

¹⁵ Butterworth and Laurence (2005: 185).

¹⁶ See the chapters in Ellis (2011a).

¹⁷ Coarelli and Pesando (2011).

¹⁸ Jones and Robinson (2007: 391–3). This may support Geertman's (2007: 86–90) proposal that the rectangular city blocks were initially laid out and were later followed by the triangular-shaped hinges.

¹⁹ Jones and Robinson (2007: 392–3). Jones and Schoonhoven (2003).

²⁰ Jones and Robinson (2007: 400).

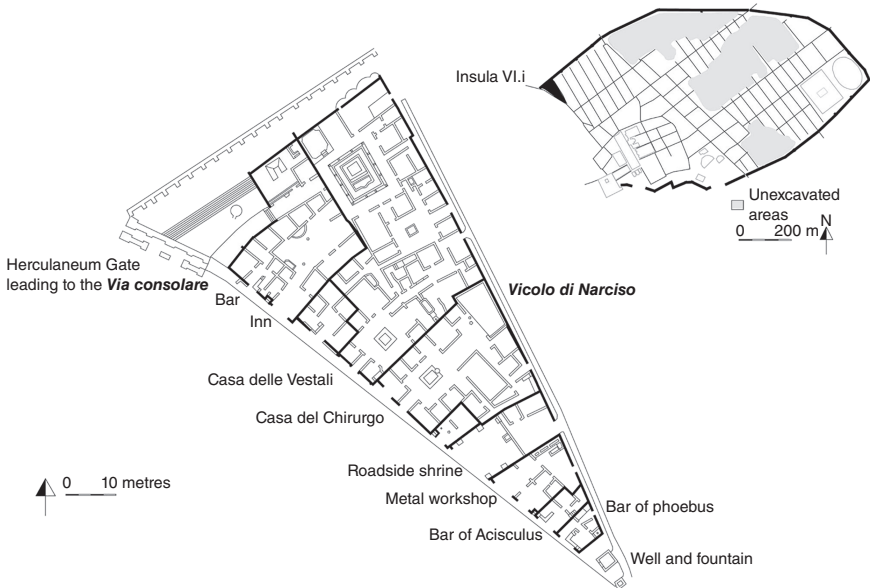


Figure 8.2 Insula VI 1 at the time of the eruption in AD 79. Map: AAPP.

insula. Although initially smaller than the Casa del Chirurgo, the Casa delle Vestali rapidly outstripped its neighbour, in terms of its size and architectural pretension, to become the most socially significant property in the city block. Crucially, when it first expanded, perhaps only a generation or so after its foundation, this was associated with both the creation of a more luxurious property *and* the construction of dedicated economic space. Such a development was accompanied by a veritable economic explosion throughout the city block in the mid-later second century BC as shops and workshops were constructed all along the Via Consolare façade of insula VI 1.

A prime example of this economic boom is the group of properties constructed at the southern tip of the *insula*, the so-called Commercial ‘Triangle’ (VI 1, 14–20).²¹ This was a purpose-built set of four workshop units dating from the early first century BC. Their construction is a clear act of investment in the urban economy. Unlike the shop units attached to the Casa delle Vestali, the Commercial ‘Triangle’ cannot be directly associated with any great Pompeian family. However, given the capital outlay necessary for the construction of the building, and also perhaps the necessity of staffing the workshops with slaves or freedmen, it is likely that a wealthy individual lay behind its construction and subsequent operation.

²¹ Jones and Robinson (2005a).

It would appear that the early economy of the *insula* was based around the production of salted fish products. Excavations have revealed the presence of tanks, either alone or in groups, and cisterns in every economic unit.²² These are uniformly located in the first room off the street and set into the ground. Some of the tanks are lined with a hydraulic plaster, whereas others were simply constructed from shuttered concrete. The plaster-lined tanks are morphologically similar to other excavated examples in Pompeii from the same period, notably around the Porta Stabia,²³ which could suggest that the examples from *insula* VI 1 are part of a wider economic phenomenon. Although morphologically similar, the specific arrangement of each workshop unit is different in terms of the dimensions of the tanks and the number and placement of other ancillary features, such as cisterns. This may suggest that the workshops were not part of a single large economic enterprise operating throughout the *insula* and beyond, but, more likely, individual or perhaps groups of workshops. It should be noted, however, that such workshops would have been seasonal in their processing and, consequently, fish-salting may only have been an aspect of their economic character, with perhaps other archaeologically invisible activities undertaken when the fish were not in season. Importantly, the economic boom also saw the development of a small-change monetary economy in the city block, with the introduction of small bronze coins.²⁴ Consequently, we have the simultaneous appearance in *insula* VI 1 of workshop units and small change, which points to a high degree of monetization for the local economy.

PARS URBANA AND PARS RUSTICA: PRODUCTION AND CONSUMPTION IN THE WEALTHY URBAN HOUSE

In the years following its initial construction, the Casa delle Vestali grew into one of the largest properties in the city. Its growth from an unpretentious courtyard building into a lavishly appointed upper-class dwelling simply mirrors the development of other such properties in the city.²⁵ What the study of the Casa delle Vestali offers, however, is the ability to link the developments taking place in the socially significant portions of the property with those going on in the areas that were economically significant. The early

²² It should be noted, however, that the attribution of the tanks to the fish-processing industry is far from proven and based upon the structural similarity of the tanks with fish-processing tanks elsewhere. In *insula* VI 1 no primary remains of fish processing have been discovered and it remains a possibility that the tanks were used for other purposes. Cf. Chapter 7 (this volume).

²³ Ellis (2011b).

²⁴ Hobbs (2005, 2013); Chapter 11 (this volume).

²⁵ E.g. Ling (1997) for the Casa del Menandro.

years of the first century BC saw further acquisitions of important economic space to the north along the Via Consolare and then along the Vicolo di Narciso in the guise of a small transverse atrium property that was probably rented out.²⁶ Again, all of these economic developments were accompanied by changes to the accommodation of the Casa delle Vestali, with the construction of the first recognizable service areas: a kitchen and toilet.

The next major phase of domestic and commercial expansion occurred during the early years of the Roman colony and saw the creation of a large, elite Pompeian house, with a traditional *impluviate* Tuscan atrium, a transverse courtyard atrium, two peristyles, and a small private bathhouse. At the same time, the owners of the Casa delle Vestali also acquired all of the valuable economic space on the Via Consolare between the northern boundary of the Casa del Chirurgo and the Herculaneum Gate. The structural developments observable in the creation of the Casa delle Vestali effectively demonstrate the rise of an urban elite; by this stage, the house was arguably amongst the top twenty houses in the city in terms of its size and architectural composition.²⁷ What is striking though in the case of the Casa delle Vestali is that its social development—in terms of the construction of atria, peristyles, private bath suites, and so on—is accompanied by its economic development and the exploitation of profitable street-front locations.

The spatial structure of the Casa delle Vestali can be seen to divide neatly into two separate zones: a locus of economic power along the northern reaches of the Via Consolare and one of social power beginning on the Via Consolare, but with the majority of this zone arranged along the Vicolo di Narciso. Such an architectural configuration was not simply the result of serendipity, but of a series of economically derived decisions pertaining to the best location for workshops coupled with the necessity for large quantities of space to be given over for social purposes.²⁸ In many respects this bipolar division is echoed in roughly contemporary literary descriptions of the ideal upper-class country villa with its *pars urbana* and *pars rustica*.

In his handbook of agricultural advice, Cato reminds the potential farmer, 'in building you should see that the steading does not lag behind the farm, nor the farm behind the steading'.²⁹ Such guidance succinctly describes the development of many contemporary villas; for example, that at San Rocco was remodelled in 30 BC from a small building with modest accommodation to an elaborate structure based around a large peristyle that was entered from the outside through a colonnaded entranceway. Clearly, in this second version of the villa, there was a need for rich display (Figure 8.3). Accompanying these domestic changes was a similarly dramatic development of the agricultural portion of the villa, which was now built around two large courtyards.³⁰

²⁶ Jones and Robinson (2004).

²⁷ Robinson (1997).

²⁸ Vitruvius, *Arch.* 6.5.1–3.

²⁹ Cato *Agr.* 3.2.

³⁰ Cotton and Métraux (1985: 35–58).

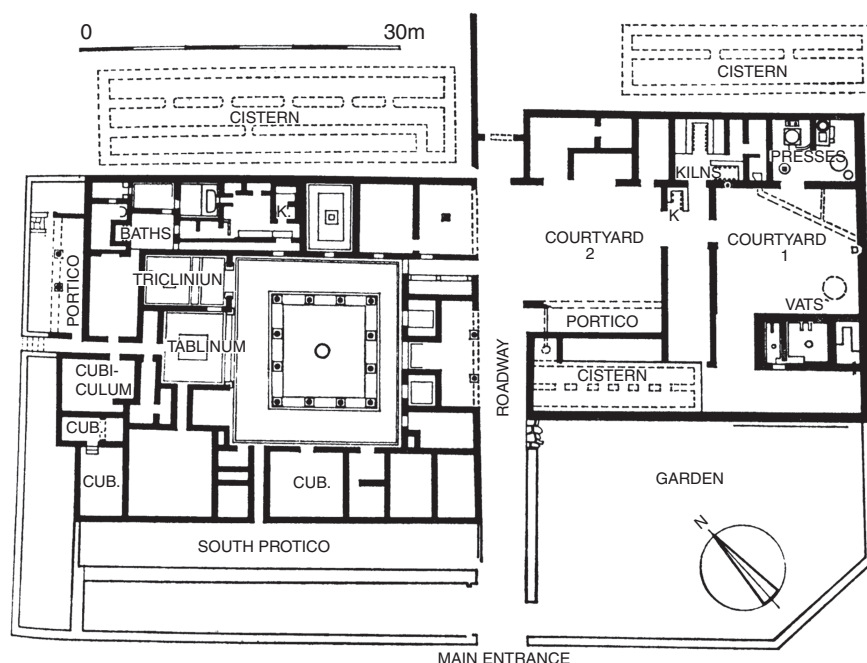


Figure 8.3 The villa at San Rocco in Francolise c.AD 50. Cotton and Métraux (1985).

After c.AD 50 a bathhouse was added to the *domus* and a tile kiln and oil press to the *pars rustica*: a luxurious development coupled with two new features that would have diversified and increased both the productivity and profitability of the estate.³¹ Consequently, throughout its life the villa at San Rocco kept up a dual function as a working farm and a place for leisure, relaxation, and social display.

The parallel development of the *domus* and its working space is also a feature of the growth of the Casa delle Vestali. Although this occurs in every phase of the architectural development of the property, the phase that is roughly contemporary with the major elaboration of San Rocco (phase II, c.30 BC) neatly illustrates the principle of the 'steading' not lagging behind the 'farm' in an urban context. The introduction of the aqueduct to Pompeii and the development of a pressurized water system supplied by the network of water pipes offered up new opportunities for social display, and the owners of the Casa delle Vestali redeveloped their property around a system of three fountains placed in both atria and the smaller of the two peristyles. The larger peristyle was taken up with a swimming pool, part of a new larger bath complex, which was also filled by the piped water system.³² As part of this

³¹ Cotton and Métraux (1985: 59–78).

³² Jones and Robinson (2005a).

phase of redevelopment, all of the reception rooms in the property were paved with fine mosaic and their walls decorated in the latest Third Pompeian wall-painting style. During this same period, the economic properties that fronted on to the Via Consolare were also redeveloped. Two shop units with large-scale cooking facilities were created, which presumably sold hot food onto the street. The northernmost of these (VI 1, 2) was constructed in the former entranceway to a service courtyard of the Casa delle Vestali. This had the advantage in creating a food outlet directly adjacent to the Herculaneum Gateway, which would have been a prime retail location. Further to the south, the facilities in a pre-existing food shop (VI 1, 5) were also upgraded during this period. Consequently, what we see during the late first century BC in the Casa delle Vestali is that, just like the villa at San Rocco, while some truly luxurious elements were added to the *domus*, the economic activities on the busy street frontage were also not ignored.

The structural analogy of the upper-class Pompeian house to the rural villa can be taken a step further with regard to the placement of, and attitudes towards, urban shops and workshops. Purcell draws our attention towards the fact that, in many villas, such as San Rocco, the main entrance of the *pars urbana* is reached by passing through the *pars rustica*.³³ Equally, at Settefinestre, a visitor to the property must pass through the farmyard before reaching the *fauces* of the residential aspect of the villa. For Purcell, such an arrangement would not have occurred through simple chance; rather, he regards the very visibility of the working parts of the building as being as much a part of the social demonstration of wealth and power as the luxurious atrium or peristyle. The productive spaces are all part of a celebration of the capacity of the local landscape, with the villa as the epicentre of profitable production. In a similar way, the typical Pompeian upper-class house with its *fauces* surrounded by shops and workshops is also an epicentre of production. The economic development of the Via Consolare is testimony to the money-spinning potential of this area of the city and the willingness of successive owners of the Casa delle Vestali to exploit it. Like San Rocco and Settefinestre, very few of what we may think of as upper-class homes are without adjacent economic properties. Arguably the two grandest houses in the city, the Casa del Fauno and the *Insula Arriana Polliana*, have their front doors surrounded by the urban economy. These are not symptoms of the social degradation of once great houses,³⁴ but a reflection of their owners' will to maximize the economic potential of their local landscape (Figure 8.1). Indeed, their Nocera tuff *opus quadratum* frontages demonstrate an architectural unity that indelibly visually links the economic properties with the larger house. In this respect, the façade

³³ Purcell (1995: 160).

³⁴ Cf. Maiuri (1960: 118) in particular; but see Maiuri (1960: 114–40) to place this in the context of his wider view of Pompeii's urban economy during its last years.

instils a sense of grandeur into these economic spaces and reveals an elite revelling in the productive capacity of their local urban landscape. The addition of shops, particularly those around the front door to a property, is not something to be ashamed of but to be celebrated. Shops display the economic power of their owners in exactly the same way as the farmyard of Settefinestre did for its owners—only here the journey from the road necessitated passing through the farmyard in order to get to the front door, rather than walking past metal smithies, garum shops, and the like.

THE ACTIVE MANAGEMENT OF URBAN PROPERTY

Book three of Varro's *Rerum Rusticarum* is given over to discussions of a new form of villa-based agriculture, *pastio villatica*. This was a form of specialized production aimed at providing delicacies to the burgeoning urban markets for enormous profits. Book III is written in the form of a conversation between various aristocratic Romans, giving advice on how to extract the maximum returns from their land through this form of specialized production. In this, Varro's Cornelius Merula ('Blackbird'), a member of a consular family, recommends the abandonment of tilling the land in suitable locations in favour of the far more profitable raising of 'large flocks of geese, chickens, pigeons, cranes and pea fowl, not to speak of numbers of dormice, fish, boars and other game': an excellent insight into the profit-seeking nature of the Roman aristocracy.³⁵ Indeed, for all of Varro's characters in his fictional dialogue, there appears to be no shame attached to making money through the effective management of your property.

In the urban context, a similar example of elite entrepreneurial activity can be seen in the construction of a large-scale commercial bakery in the Casa del Labirinto (VI 11, 9–10), in the years after earthquake. While Strocka took this to imply a change of ownership and the potential social downgrading of the property,³⁶ this can perhaps better be seen in the same way as the addition of the tile kiln to the villa at San Rocco: the bakery is simply a means of enhancing the economic potential of the property. The Casa del Labirinto sits on a street with few shops. There would have been no point in opening a shop here, as there would have been little potential to capture passing trade. Consequently, the construction of the bakery can be seen to reflect the desire of the wealthy owner of the property to invest capital in works of economic infrastructure in order to seek profit from it. Here, Varro's advice on building

³⁵ Varro RR 3.2.13–18.

³⁶ Strocka (1991: 134–5). For a different view cf. Pirson (1999: 47, 167–71).

an aviary, hare warren, and fish pond in order to increase the profits of a villa is apposite:³⁷ both rural and urban elites again act in similar ways.

The decision completely to change the agricultural regime of a farm to fit new economic circumstances and to chase profit would appear to be entirely natural. Such behaviour is also apparent in the urban context. In the early years of the empire the commercial properties attached to the Casa delle Vestali (VI 1, 2, and 5) were involved in the retailing of hot food and possibly drink. Sometime after the mid-first century AD, perhaps following the earthquake, the adjacent courtyard area, which was previously part of the service area of the Casa delle Vestali, underwent a radical change that saw the development of a large inn, with an attached bar and an upstairs rental apartment.³⁸ The expense entailed in the construction of such a multi-storied establishment must have been considerable and the expectation of the monetary rewards it would bring must also have been equally high. While the inn was no longer physically connected to the Casa delle Vestali, it is suggested that ownership was retained and that this phase of construction was part of a larger development that also saw the complete reconstruction and redecoration of the elite house, which also included adding a second storey around two sides of its peristyle. Altogether, this phase of construction demonstrates the entrepreneurial attitude of its upper-class owners, who were unafraid to branch out into new areas of the economy when circumstances prompted them to do so. The decision to construct an inn was taken in the light of the changing nature of the urban economy in the years after the earthquake. During the reconstruction of the city there would probably have been a large transitory workforce of labourers, craftsmen, and traders who would have provided a ready clientele for the inn, not to mention inhabitants of the city itself who may found themselves either temporarily or permanently without accommodation of their own.

The provision of additional rental accommodation also appears to have been an important facet of the economy of the *insula* in the mid-first century AD; all three upper-storey rental apartments can be dated to this period. In the Commercial 'Triangle', the four individual shop units were reconfigured at this time into three, comprising of two bars and a metal workshop, and an upstairs rental apartment. The construction of the apartment necessitated the addition of a second storey across the entire group of properties, which also entailed the replacement of the Sarno stone doorframes with new, taller ones in Nocera tuff.

The fact that the new upper storey ranged over the entire group of properties demonstrates that a single person owned the units, although it is, of course, impossible to know whether the units were split up and later recombined, were

³⁷ Varro RR 3.3.

³⁸ Jones and Robinson (2007: 402).

passed down a single family over the generations, or were bought, sold, or given, as a single unit over the 150 years after the Commercial 'Triangle' was first constructed. What it does demonstrate is that, in the mid-first century AD, the properties were owned by an individual who was able to take radical decisions about their economic direction and to finance these changes. Here Cicero's highly profitable shops in Puteoli again come again to mind; they were making 80,000 sesterces a year following their reconstruction, which Cicero hoped would rise to 100,000.³⁹ Together, the changes in the Commercial 'Triangle' and the Casa delle Vestali throw into sharp relief the active management of these portfolios by their owners. Who else would have been able to sanction the outlay of the necessary capital for construction? Obviously, once rebuilt, these workshops would either have been rented out or run on behalf of their masters by agents (*institores*), again though the agents would not have been entrepreneurs themselves but simply managers: 'the equipment used, the money invested in the business, and the gains that it produced belonged directly to the patron, who was the entrepreneur'.⁴⁰

Like the owners of the Casa del Labirinto, those of the Casa delle Vestali were also able to make pragmatic business decisions to sacrifice formerly opulent space in order to make an economic profit. Instead of constructing a bakery inside their *domus*, the owners of the Casa delle Vestali abandoned their opulent garden *triclinium*, which was now incorporated, albeit in a less grand form, into the newly constructed inn (Figure 8.4). While this may be regarded as a reduction in the facilities of the large house, this would not have necessarily have been the case, as the outdoor *triclinium* that was lost may simply have been replaced by converting the area around the fountain in the large peristyle into a similar kind of outdoor eating space.⁴¹ The economics of such a change are again echoed by Varro who asserts that 'the farmer should aim at two goals, profit and pleasure; the object of the first is material return and the second enjoyment. The profitable plays a more important role than the pleasurable'.⁴² Clearly, the economic gains to be had from an inn with a luxurious outdoor eating space were greater than any social gains provided by the retention of this particular *triclinium*.

The construction of an inn in this location also demonstrates another facet of the keen eye for profit of the Casa delle Vestali's wealthy owners. Inns and bars cluster around the Herculaneum Gate, with a second large complex of an inn and bars directly across the road in the Insula Occidentalis (VI 17, 1–4), while, a little further down the Via Consolare is another in the converted Casa di Sallustius (VI 2, 1–5). Such gate-side locations obviously represent the

³⁹ Cic. *Att.* 364 (14.10.3).

⁴⁰ Andreau (1999: 66).

⁴¹ See Jones and Robinson (2005b) for changes to the fountain system in the Casa delle Vestali and Andersson (1990) for a close parallel in the Casa del Torello di Bronzo (V 1, 7).

⁴² Varro *RR* 1.4.2.



Figure 8.4 The outdoor *triclinium* of the inn. Photo: AAPP.

first point of contact between the city and the traveller, and thus the construction of a new inn at such a location can clearly be seen as an attempt to capture as much of a share of the potential market as possible.

The four bars in insula VI 1 are part of two economic portfolios: the Casa delle Vestali and the Commercial 'Triangle'.⁴³ It has been suggested that the counter was deliberately placed to encourage customers into the bar depending upon whether they were travelling up or down the street (Figure 8.5).⁴⁴ In both sets of bars the two counters face in opposite directions, up and down the Via Consolare. Consequently, it would appear that the owners may have deliberately chosen to operate a pair of bars to maximize potential contact with customers and hence their economic potential. In a similar way, the two bakeries on each of the corner shop units of the Insula Arriana Polliana (VI 6, 20–21 and 4–5) also appear to have operated in conjunction: one bakery had mills, the other did not.

It should be noted, however, that developments within the economic portfolio of a household might not be related to developments other than the economic circumstances of the city. For example, in insula VI 1 there were four properties selling hot food and drink on the streets in the early years of the first century AD. These were characterized by their large cooking platforms,

⁴³ Cf. Pirson (1997; 1999) and Robinson (2005) on upper-class interests in Pompeii and their diverse economic portfolios.

⁴⁴ Ellis (2004).



Figure 8.5 The bar at VI 1, 5, with its counter orientated to attract customers on the Via Consolare travelling towards the Porta Ercolano. Photo: Damian Robinson.

usually located in rooms that can be thought of as kitchens, and which would have enabled a range of dishes to be prepared and sold to passers-by on the streets. In the middle of the first century AD, without exception, all of these properties were changed into bars and had their cooking facilities substantially downgraded; the heating equipment now would only have perhaps been suited to warming wine and possibly small amounts of food. The context for such a shift may be found not in the changing economic circumstances of the city but potentially in a succession of imperial edicts banning the sale of hot food on the streets.⁴⁵ Clearly, if such legislation were enacted in Pompeii and such properties were to remain in business, then there had to be a shift in the economic priorities of the establishment.

Purely economic concerns did not always triumph over social ones and, in the middle of the city block, there is evidence that owners were also willing to sacrifice prime economic space for purely social gain. Towards the middle of the first century AD, two workshop units, which were initially constructed at the time of the second-century BC economic boom, were demolished (Figure 8.6). A large shrine, possibly to the Lares Augusti, facing onto the Via Consolare, and a stabling area on the Vicolo di Narciso, replaced these

⁴⁵ E.g. Suetonius *Tiberius* 34, *Claudius* 38, *Nero* 16; cf. Wallace-Hadrill (1995: 45–6, 59 nn.35–40).



Figure 8.6 The remains of workshops underlying the Shrine to the Lares Augusti. Photo: AAPP.

workshops.⁴⁶ While an economic function for the stable area (VI 1, 22) cannot be discounted, the deliberate sacrifice of prime economic space on the Via Consolare is the only occasion in the history of the city block where workshops were removed and not replaced. While this could be seen as a deliberate act of piety in keeping with the new visual, religious, and festival rhetoric of the early imperial age, a building such as the shrine (VI 1, 13) should also be understood to have spoken to a local audience.⁴⁷ Here then, the construction of the shrine was an act that, while sacrificing economic capital, actively generated social capital: perhaps the very act of ‘conspicuously consuming’ the workshops ensured that the dedication was that much more significant.

CONCLUSION

In their book *Pompeii: The Living City*, Butterworth and Laurence paint an evocative picture of the final years of urban life in which power was held by a

⁴⁶ On association of the shrine with the Lares Augusti cf. Fiorelli (1875: 81); Laurence (1994: 42).

⁴⁷ Lott (2004: 132, 135).

spectrum of rich people.⁴⁸ There were members of what we might think of as a traditional curial aristocracy, through the new men—descendants of freedmen made good—to the rich freedmen themselves. Such a picture is entirely in keeping with epigraphic studies of social mobility in the Vesuvian cities, which dramatically demonstrate the fluidity of the social order.⁴⁹ While some authors have inferred from this fluidity new economic values suffusing the final years of urban life, I would take a different tack. When viewed over the long term, properties such as the Casa delle Vestali reveal not so much a city in social and economic upheaval, but simply the continuing search for social and economic capital by wealthy owners. I would stress that an essential continuity in the economic identities of the upper stratum of urban society, whatever their origins, is more apparent than any radical change. Since the appearance of the first shops and workshops, the Pompeian upper class can be seen to have demonstrated a keen eye for entrepreneurial activity and a willingness to *salve lucrum*. What is more apparent is that, rather than social revolution, yesterday's freedmen produced tomorrow's curial elites; in other words, social assimilation, not social revolution, was the order of the day. This can be seen most vividly in the case of Numerius Popidius Celsinus and his son: it is the absorptive power of Pompeii's elite and the way in which they effortlessly incorporated people that we see in the inscription above the entrance to the Temple of Isis.⁵⁰ Such newly made members of the urban elite came to take on the socio-economic identities of their former masters: the large house in a prominent location surrounded by economic properties containing their own slaves, freedmen, tenants, and clients.

Unfortunately, we do not know the identity of any of the inhabitants of the Casa delle Vestali at any point during its history. From the first century AD they would assuredly have been amongst the richest inhabitants in the city, but whether the property remained in the hands of an individual family or was bought and sold amongst members of the Pompeian aristocracy, Sullan colonists or other incomers, or to a number of rich freedmen, we just do not know. What we can say, however, is that the commitment of its various inhabitants to the urban economy and to a core set of money-making values does not change from the inception of a monetary economy in the second century BC until its destruction in AD 79, and neither does their commitment to the social role of the house itself; the two go hand in hand. Indeed, the house and its shops can be seen as a vital part of the social armoury that demonstrated the wealth of the inhabitants.

⁴⁸ Butterworth and Laurence (2005).

⁴⁹ Mouritsen (2001).

⁵⁰ *CIL* 10.846: 'Numerius Popidius Celsinus, rebuilt at his own expense from its foundations the Temple of Isis, which had collapsed in an earthquake; because of his generosity, although he was only six years old, the town councillors nominated him into their number free of charge.'

Finally, I would like to return to the Roman agronomists with whom we started and wonder why there was no equivalent manual for urban money-making? This review of the evidence for the wealthy Pompeian entrepreneur would suggest that there was simply no requirement for such texts to be written. The agronomists wrote for an educated urban audience and aimed to provide them with help and advice about how to profitably own and run rural businesses. Their works were perhaps aimed at encouraging the newly rich and newly enfranchised to invest in rural land and to become good Roman farmers. There was simply no requirement to teach the wealthy urban classes how to make more money from their urban property: this was already ingrained within their very self-image and economic identity.

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The Economics of Pompeian Painting

Domenico Esposito

Almost all houses in Pompeii had some form of painted decoration on their walls. Traditionally, this decoration has mostly been studied from an art-historical perspective, to understand its stylistic properties and its ideological or symbolic meanings, and—later—to discuss its role in marking the social status of households. Until recently, very few scholars have discussed the economic aspects of the production of wall decoration at Pompeii. Yet, given the widespread consumption of wall decoration, and the evidence for painters at work in AD 79, understanding the economics of decorating walls would shed useful light on a highly relevant aspect of the Pompeian economy. There is growing evidence that wall painting should not be thought of as high-level artistic production, but rather the result of a system of ‘mass production’. As such, Roman painting can be viewed simply as something produced for commercial ends. Admittedly, it was a product created from a rich craft tradition and with great technical skill, but one always closely linked to the demands of an extensive and dynamic market that emphasized the close relationship between customer and artist. In recent years there has been a renewed interest in the subject of painters’ workshops, and there has been a series of contributions examining the dynamics underlying the production of wall painting.¹ The present study aims to present a synthesis of the problem of labour organization within the workshops, and the socio-economic problems associated with the production of wall painting.²

PICTORES PARIETARII AND PICTORES IMAGINARII

One major difficulty in addressing this topic is the use of particular terminology which, by convention and habit, has been widely accepted by scholars of Roman

¹ Moormann (1995); Tybout (2001); Bragantini (2004); Esposito (2007; 2009).

² Esposito (2009).

painting, but which has also resulted in confusion on more than one occasion. This relates to the traditional distinction between *pictores parietarii* and *pictores imaginarii*, passed down in this form in the Edict of Diocletian. The first are usually thought to have been simple decorators who painted the backgrounds of the walls and the secondary decorative elements. The *imaginarii*, on the other hand, were considered to have been the painters of the pictures, or at least the figured elements of the decoration. However, as early as 1958, Ida Calabi Limentani suggested that the expression *pictor imaginarius* actually referred to a painter of portraits.³ To support her idea, she cited a passage by Pliny the Younger in which he asked Vibius Severus, a friend from Verona, to find a local painter who could paint the likenesses of two illustrious Veronesi, Cornelius Nepos and Titus Catius. Pliny explained that he had turned to his friend because it was at Verona, rather than anywhere else, that one might find someone who could provide a faithful record of the sitters' true appearance. Calabi Limentani emphasized that the language used by Pliny the Younger is very precise, and in particular that his use of the verb *adsumo* implies the *locatio* of the painter.⁴

The distinction between *parietarii* and *imaginarii* thus indicates a clear difference between individuals who painted portraits, the *imaginum pictores* or *pictores imaginarii*, and those who painted walls, the *pictores parietarii*. Within the broad category of *pictores parietarii* there was no distinction in type between decorative and figurative painters. However, it is quite obvious that differences must have existed, relating to skill and so to the specific technical competences of individual painters. Similar distinctions must also have existed in relation to mosaicists, who are divided into *musaearii* and *tessellarii* in the Edict of Diocletian. Katherine Dunbabin has emphasized how the distinction commonly drawn between wall mosaicists (*musaearii*) and floor mosaicists (*tessellarii*) cannot be right. Here too the distinction must have been based on the individual craftsman's level of skill, or rather between those who could make mosaics with elaborate designs and those who made simple mosaic floors without ornamentation.⁵

On a purely archaeological level, the evidence is poor and circumstantial, but no less significant for that reason. Some pieces of evidence do seem to confirm a distinction between individuals who painted portraits and those who painted walls. Paintings that depict artists at work are found only rarely in the field of ancient painting. However, one Pompeian painting of unknown provenance depicts a female painter at work in her studio.⁶ The artist is working on a panel painting of a cloaked, standing female figure.

³ Calabi Limentani (1958: 66); this hypothesis has been revived in recent years by Andersen (1985: 113) and Bragantini (2004: 131).

⁴ Plin. *Ep.*, 4.28.3: '*peto autem, ut pictorem quam diligentissimum assumas*' ('So I beg you to find the most precise painter you can.')

⁵ Dunbabin (1999: 275–6, n.39) emphasizes also that the *tessellarius* received the same pay as a stone-cutter, a carpenter, or a baker, while a *musaearius* earned as much as a marble worker or a shipwright.

⁶ MANN, inv. n. 9017; Bragantini and Sampao (2009: 102, cat. 2, with previous bibliography).

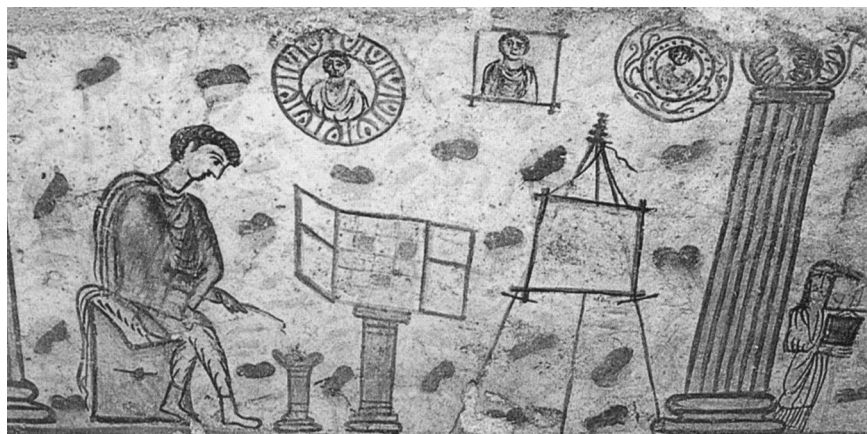


Figure 9.1 Kerch sarcophagus: depiction of a painter at work. Photo: Domenico Esposito.

Whether the figure depicted on the panel is a portrait or a fantasy image is unclear.⁷ Of greater interest is a painting, unfortunately lost now, and known only from engravings, that once decorated a *predella* in the atrium of the Casa della Regina Carolina (VIII 3, 14).⁸ It depicts a painter painting a man's portrait, both figures represented in the guise of pygmies. The painter is sitting on a stool with his easel in front of him, on which stand a wooden panel and a palette of colours. In front of him, also sitting on a stool, is the man posing for the portrait. Another interesting piece of painted evidence is the interior decoration of the Kerch sarcophagus, dating to the late first or early second century AD (Figure 9.1).⁹ The inside walls of the sarcophagus are painted with a series of scenes, framed by Corinthian columns, one of which depicts a painter. He seems to be painting the portrait of the deceased, who is in turn depicted at a banquet in the immediately preceding scene.¹⁰ The artist is shown heating a metal instrument in the flame of a stove. Behind him is a short column on which lies an open box, its interior divided into twenty square compartments, each containing a different colour. In addition to this small column is an easel supporting a canvas. The scene appears to be set in the painter's workshop. Indeed, the walls of the room in which he is working are hung with portraits, either on panels or in the form of *imagines clipeatae*.¹¹

⁷ Note also a picture, another scene of everyday life, in which a female painter concentrates on painting a herm, also on a panel. MANN, inv. n. 9018; Bragantini and Sampaolo (2009: 102, cat. 1, with previous bibliography).

⁸ Mazois (1824–8, II: 68); Zahn (1828–59, I: pl. 86).

⁹ For a full description of the decoration of the Kerch sarcophagus and its interpretation, see Rostovtzeff (2003: 474–90, with previous bibliography).

¹⁰ Rostovtzeff (2003: 477–8, 484–6, pl. XCII).

¹¹ The two portraits in circular frames decorated with vegetal and ovolo motifs find specific *comparanda* in the *clipei* with togate figures found in the seventeenth-century

STUDYING PAINTERS' WORKSHOPS

As one might expect, different areas of specialism among *pictores* were also reflected in their different places of work. The *pictores imaginarii* must have worked primarily in their studios, while the *parietarii* worked on site, and so moved constantly from one building to another. As can be seen from the remains of numerous examples preserved on the walls of houses in the Vesuvian cities, painted portraits were very popular.¹² However, no locations in Pompeii can be identified specifically with painting activity or identified as painters' workshops,¹³ with the sole exception of the house I 9, 9. During the excavation of this small house in 1952, 150 vessels containing colours were found. Excavations in the same room in 2001 uncovered a series of pits containing pottery fragments with traces of colour, including a fragment of a vessel with patches of blue, pink, and ochre, as if on a palette. The three colours had been mixed together to produce a grey-violet colour which could also be seen around the edge of the fragment. Along with this 'palette' were found a number of eggshells and other fragments of amphora.¹⁴ Other pits containing pottery fragments with traces of colour were found in the area of the small garden (5) and provide further confirmation that painters worked inside this building. The material found in the pits can be situated within a fairly precise chronological framework, between AD 60 and 79. On the basis of this evidence, Tuffreau has hypothesized that the building at I 9, 9 was the workshop of a small group of painters engaged in fresco painting, painting on easels, or, alternatively, producing *picturae ligneis formis inclusae*. This entailed painting, in a studio context, figured panels using fresco technique on a thin layer of *tectorium*. These were subsequently framed and enclosed within a wooden frame that was inserted into the wall, with the surface of the painting

excavations in the forum of Cuma and in other examples from *Iulium Carnicum*. Cf. Zevi et al. (2008: 312); Cavalieri Manasse (1995; 2001). In painting, the *imagines clipeatae* of the Kerch sarcophagus can be compared with those painted on the walls of the atrium of Villa A at Oplontis. These have the same type of frames, decorated with ovolo, bead, and vegetal motifs. Cf. De Franciscis 1975.

¹² On painted portraits in the Vesuvian cities, see De Kind (1991); De Maria (1997); Nowicka (1993); Pappalardo (1991); Thompson (1979); Zanker (2002: 112–32).

¹³ For analysis of the structures considered, on the basis of indirect evidence or arbitrary judgement, to have housed painters' workshops, see Esposito (1999: 21–2; 2009: 23–4).

¹⁴ Twenty bowls containing colours were found in the first room (1a). Then, near the entrance to the house, a small cupboard was found with many objects and tools used by painters. Among them were stone pestles, slate slabs used to sharpen tools, knives, blades, and spatulas, hammers, compasses, a plumb bob, weights for scales, a tool with a central handle, clearly used to apply plaster, and lots of bowls containing colours (black, white, brown, different shades of blue, red, grey, pink, orange). There were also several miniature vessels and a plate with blocks of white, brown, and blue pigment. See Borgard et al. (2003: 25).



Figure 9.2 *Pictura ligneis formis inclusa* (Herculaneum, Apartment V, 18; Photo: SANP, EC 425).

level with the plaster of the wall intended to receive it. This custom of painting panels in the studio and then inserting them into the pre-painted walls of houses was something demonstrated effectively by Amedeo Maiuri in his study of all the remaining traces from Pompeii of paintings that were framed and inserted into the walls of houses.¹⁵ Even clearer proof was provided by the discovery of a painting, a *ligneis formis inclusus*, in situ in a first-floor room of the structure V.17–18 at Herculaneum (Figure 9.2).¹⁶

¹⁵ A more practical and economic method used in the Vesuvian cities in the last years before AD 79 involved the reuse of older paintings or simple fragments of decoration in repainted rooms. See Maiuri (1940).

¹⁶ Maiuri (1938).

WORK ON SITE

The organization of the work of the painters employed on site must have been different. This has been shown clearly by the excavation directed by Antonio Varone in a room (12) of the Casa dei Pittori al Lavoro (IX 12, 9) at Pompeii.¹⁷ This has enabled us to re-evaluate other interesting Pompeian structures that were in the course of redecoration at the time of the AD 79 eruption, such as the Casa del Sacello Iliaco (I 6, 4),¹⁸ house I 11, 17,¹⁹ and house II 8, 6.²⁰ To these examples can now be added room I on the first lower level of the Villa dei Papiri at Herculaneum, also in the course of restoration and redecoration at the time of the eruption.²¹ During removal of the volcanic fill along the walls of the room, remains of a wooden structure were found, still in situ, but carbonized (Figure 9.3). These remains can probably be identified as scaffolding. This was made up of vertical posts fixed to the walls with iron nails, and wooden planks which must have formed part of the scaffolding. Along the east wall, scaffolding planks were found directly in front of a section of unfinished decoration (Figure 9.4).

In the Casa dei Pittori al Lavoro at Pompeii at least two rooms, the *oecus* (4) and the salon (12), were undergoing redecoration at the time of the eruption. From study of the excavation context of the salon (12) we learn, in particular, that several painters were engaged in working on different walls at the same time. This is important for several reasons. First, there was no rigid sequence in the execution of work on the walls of a single room. Depending on their particular skills, the painters might be employed on adjacent sections of a wall or on sections further apart, or even on different walls. In the salon (12) of the Casa dei Pittori al Lavoro, for example, one decorator was painting the architectural features of the middle zone of the east wall (Figure 9.5), while his colleague was engaged in painting the mythological panel in the centre of the north wall (Figure 9.6). On this same wall a third decorator may have been painting the black background of the panel adjacent to the middle zone, as

¹⁷ In particular, see Varone (1995; 1998); Varone and Béarat (1997), and the most recent discussion in Esposito (2009: 22–4, 119–23).

¹⁸ Almost all the rooms in the Casa del Sacello Iliaco were undergoing redecoration. The garden and the service rooms were being used temporarily to store large lumps of limestone, from which lime could be extracted. There was a large furnace for this process in one room (s). The rooms around the atrium were all undergoing redecoration; in the *tablinum* (f) the walls were still completely bare of plaster; in room (h) the walls were rough, except for the upper register; in the *triclinium* (c) and *cubiculum* (d) only the plaster of the *socle* was missing; in room (i) the decoration had been completed; in room (l) only the paintings to be set into the centre of the walls were missing. See Strocka (1984); Esposito (2009: 24).

¹⁹ Esposito (2009: 187–9).

²⁰ Esposito (2009: 222–4).

²¹ Room I of the first lower level of the Villa dei Papiri has been explored only to a limited extent, because the excavation was not able to reach the floor level. See Guidobaldi and Esposito (2009: 346–52); Guidobaldi, Esposito, and Formisano (2009: 144–53).



Figure 9.3 Villa dei Papiri. Room I on the first lower level of the *basis villae*: carbonized remains of scaffolding. Photo: Domenico Esposito.



Figure 9.4 Villa dei Papiri. Room I on the first lower level of the *basis villae*: unfinished decoration. Photo: Domenico Esposito.

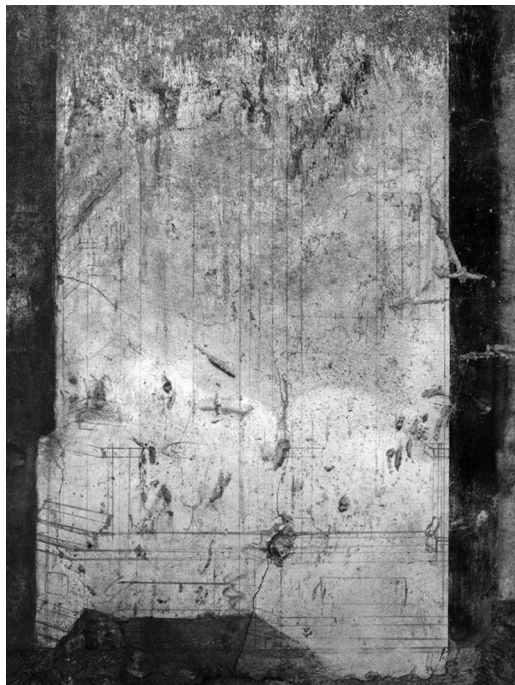


Figure 9.5 Pompeii, Casa dei Pittori al Lavoro, room 12, east wall, sinopia of architectural frames. Photo: Domenico Esposito.



Figure 9.6 Pompeii, Casa dei Pittori al Lavoro, room 12, north wall: unfinished panel picture. Photo: Domenico Esposito.



Figure 9.7 Pompeii, Casa dei Pittori al Lavoro, room 12, north wall: unfinished decoration. Photo: Domenico Esposito.

seen from the remains of the wooden scaffolding placed right in front of this part of the wall (Figure 9.7). Finally, a fourth painter was doing the overpainting on dry fresco on the eastern section of the south wall. Analysis of the contents of the bowls of colour found in the salon (12) has shown that many variants of the same colour were being used, including four different shades of white. Moreover, this same analysis has revealed that two painters were working ‘a fresco’ while the other two were working ‘a secco’ or rather ‘a fresco secco’ (on dry plaster).²² This simultaneous work by multiple painters (at least three or four) on different walls of the room (12) shows clearly that they had only a short time to produce the required decorative scheme. Even seemingly complex and elaborate decorative schemes, like the architectural features of the middle zone of the east wall, or the mythological panel of the north wall, could have been completed in a single day.

²² Varone (1995: 129–31); Varone and Béarat (1997).

From such observations we can 'reconstruct the subdivision and the gradation of tasks among the craftsmen employed in the decorating'.²³ From the points made, it is clear that painted decoration required teamwork by a group of painters of a kind that cannot be attributed to merely temporary or occasional collaboration. The complexity of the different operations at a site where painters were working required not just great technical skill, but also a stable organizational structure. This must have been based on distinct specializations among workmen, organized according to a precise hierarchy,²⁴ and a clear subdivision of tasks, relying on cooperation and coordination between the different craftsmen employed in creating painted decoration.²⁵

Another potentially sensitive issue was the necessary relationship established with other categories of craftsmen engaged in work on the same site, such as mosaicists, plasterers, and masons. Unfortunately, the archaeological evidence does not show clearly how these different craftsmen interacted on a single site or specifically whether they were part of a single business enterprise. Obviously different contexts, for example, public or private, and (in particular) the involvement of the client, are all factors that strongly influenced the choice of one or more craftsmen and/or businesses and the level at which they might collaborate.

Epigraphic, legal, and literary sources do not provide clues either. However, we do know from a number of epigraphic sources that the work of the *pictores* was closely related to that of the *structores*. The *Lex de parieti faciendo*, an exceptional document found at Pozzuoli in the sixteenth century, includes a section relating to the construction of an enclosure wall for an open space next to the Temple of Serapis at Puteoli in 105 BC. Besides the requirements dictated by the *duoviri* to the *redemptor*, it describes in detail all the work that was to be done, with particular emphasis on the choice of materials used and their relative quantities. In particular, the wall was to be faced with three layers of *tectorium*, the last of which was to be *calce uda dealbata* ('whitewashed with moist lime').²⁶ A mosaic inscription found at Montorio in Piceno, dating to 55 BC, records the construction and decoration of a temple dedicated to Hercules by three local magistrates, who: '*aedem [...] fac(iendam) ping(endamque) c(oeraverunt)...*' ('supervised the construction and decoration of a temple').²⁷

²³ Varone (1995: 133).

²⁴ The existence of a hierarchy of roles on site is clearly shown by the Sens relief in which all the professional figures involved in the production of a wall painting can be identified, from the boy who mixed the lime and spread it on the walls to the *pictor parietarius* who painted them, and the *redemptor* who supervised and coordinated the work. On the Sens relief, see Uffler (1971).

²⁵ Esposito (2009: 31–6).

²⁶ CIL 10.1781: '*Imponito eosq(ue) parietes marginesque omnes, quae lita non erunt, calce harenato lita politaque et calce uda dealbata recte facito [...]*.' On the *Lex de parieti faciendo*, see Zevi et al. (2008: 68–9) with previous bibliography.

²⁷ CIL 9.5052; Calabi Limentani (1958: 134).

As Calabi Limentani pointed out, in this type of inscription the work of the painters is recorded officially in the dedicatory inscription of the building as an activity complementary to the actual construction.²⁸

The Vesuvian cities provide numerous examples of buildings restored after damage caused by the AD 62 earthquake, or by the seismic tremors preceding the eruption of AD 79.²⁹ At Pompeii, after the earthquake, reconstruction and restoration work was begun at many locations, much of it completed within a few years thanks to the generosity of private citizens. The most famous example is the Temple of Isis (VIII 7, 28) which, as recorded in the dedicatory inscription over the entrance, was reconstructed 'a *fundamento*' thanks to the generosity of N. Popidius Celsinus.³⁰ The removal of numerous fragments of paintings and the disintegration of the paintings left in situ after the eighteenth-century excavation enable us to see the techniques used to build the walls. In the portico (1) and the *ekklesiasterion* (6) the walls were completely reconstructed in *opus incertum*, with limestone *caementa* and occasional tufa, lava, and brick inclusions bonded with abundant pozzolana mortar. The door jambs and pillars were made of *opus vittatum mixtum* while the columns were constructed in *opus testaceum*. The temple itself was completely reconstructed in *opus testaceum*; column drums, capitals, pilasters, and decorative elements of grey tufa from the late Hellenistic period were all reused.³¹ Immediately afterwards, the painted decoration and stucco were renovated in the temple, its surrounding portico, and the *ekklesiasterion*.³² The simultaneous execution of the decoration and the building work also can be seen in the way the decorative scheme chosen for the portico (1) was adapted to accommodate intrusive features such as niches, doors, and other

²⁸ It should be noted, however, that Calabi Limentani (1958: 134–5) cites this evidence as part of a discussion intended to clarify the questions of when, and to what extent, painted decoration was mentioned, even in inscriptions, as an object of art in its own right rather than as a mere ancillary to the structure it was painted on. This treatment of painting as art in its own right is clear, for example, in the dedication of *tabulae pictae* and of proper panel paintings that were donated for public appreciation as gifts to adorn monuments or public buildings.

²⁹ See Chapter 7 (this volume: 210–12).

³⁰ On the restoration of the Temple of Isis, see Maiuri (1942: 68–70, tav. XVI); De Caro (1994); Zevi (1994); Pesando (2002). A different interpretation of the chronology of the temple and particularly of the extent of the restorations financed by the Popidii has been put forward recently by Blanc, Eristov, and Fincker (2000). This is repeated in Pesando (2002) and in Pesando and Guidobaldi (2006: 68–9).

³¹ Wallat (1993: 374) has shown that the brickwork used in the Iseum was the same as that used in the so-called Central Baths, which were undergoing restoration at the time of the eruption.

³² In recent years the paintings from the Temple of Isis preserved in the Naples Museum have been studied and the results published by Valeria Sampaolo. See Sampaolo (1992; 1994; 1995); *PPM* 8: 732–849. For the stucco work, see the study of Blanc, Eristov, and Fincker (2000).

openings that interrupted the continuity of the scheme.³³ It is also possible to see a clear connection between the stucco decoration, which still survives on the walls of the temple, and the painted decoration, particularly in the spiral acanthus frieze which crowns the external walls of the temple *cella*: these are similar to the spiral frieze painted on the walls of the portico enclosing the temple.³⁴ It is very possible that a single workshop was employed to decorate the Temple of Isis, or alternatively, perhaps, one large business including both *pictores* and *tectores*. The Temple of Isis is a good example of the operational dynamics within a large site where different craftsmen had to collaborate to complete a single project. The exact nature of the relationships between the different categories of artisans involved—*structores*, *pictores*, *tectores*, and so on—is unknown, as is whether the client dealt with a single *institor* or *redemptor*, or whether multiple *officinae* were hired to work together on the same commission.

Another interesting example is the so-called Edificio dei Triclini at Moregine, located outside the city, about 500 m south of the Stabian Gate.³⁵ This building consists of a three-sided portico enclosed on at least two sides by rows of *triclinia*; at the time of the eruption in AD 79 an extension was being added to the west side of the portico, to serve as a bathhouse. The discovery in the 1959 excavations of the famous ‘Murecine tablets’ of the Sulpicii, a family of merchants from Puteoli, and, more recently, of about 180 marble slabs bearing the abbreviation ‘SVL’, shows not only that the building was the property of the Sulpicii, but also that they had commissioned its initial construction and still owned it at the time of the large-scale reconstruction under way when the eruption in AD 79 happened.³⁶

The construction techniques used in the Moregine building are essentially *opus reticulatum*, used for the jambs, and *opus testaceum* and *opus vittatum*

³³ Along the south and west walls in particular the decorative scheme must have been adapted to the constraints imposed by the architecture, namely the three doors and wide niche on the south wall and the five large arched openings in the west wall which led into the *ekklesiasterion* (6).

³⁴ Unfortunately, the stucco frieze has been lost almost completely. However, the few remaining traces are very similar to the painted frieze of the portico (1). It seems likely that the plasterers and the painters used the same papyrus stencils.

³⁵ The building has been excavated twice, once in 1959 and then between 1999 and 2000, but neither project was able to complete its excavation, since part of the structure is located underneath the Napoli–Salerno motorway. On the excavation and theories regarding its use and function, see Elia (1961); Maiuri (1961); Pagano (1986); De Simone and Nappo (2000); Nappo (2001); Mastroberoberto (2002; 2003); Wallace-Hadrill (2004); Adamo-Muscettola (2005); Zevi (2005: 105–8).

³⁶ The *tabulae ceratae* have been studied and published by Camodeca (1999). They show that the Sulpicii moved to Puteoli after AD 61, because the archive stops just before that year. The abbreviation ‘SVL’ on the marble slabs (which were apparently intended to decorate the bath complex) clearly alludes to the Sulpicii; numbers also were incised in the slabs; these probably relate to the different marble slabs that were delivered. See De Simone (2000: 74–5).

for the partition walls. The fourth-style wall paintings were all done by the one workshop of painters and were executed immediately after the walls were built, and, as such, result from a single, planned project.³⁷ However, even here, where the identity of the clients is known and the architectural and decorative programme is clearly planned and consistent, it is impossible to go beyond the observation that the painters employed to decorate the complex worked very closely with the other craftsmen involved in the commission.

At the time of the eruption, simultaneous restoration of the masonry structures, the floors, and the wall paintings was taking place in the Casa dei Pittori al Lavoro (IX 12, 9). In a small room (9) near the kitchen very small fragments of amphorae were accumulated to be crushed further to make *cocciopesto*. In another room (11), also connected to the kitchen, there was a pile of river sand, on which white mosaic tesserae had been piled. Part of the *cocciopesto* floor was missing in the part of the peristyle (2) that gave access to room (12), where the wall paintings were being renovated. In the *porticus* in front of this room seven *pluteus* walls were added, still unplastered, as were the columns and pilasters that supported the porch roof. Finally, beneath the portico was a large pile of stones for the restoration of the walls. Inside room 12 the painters' work was at an advanced stage: the ceiling, upper register, and much of the middle zone had already been completed.³⁸ The floor of the room consisted of a central *emblema* in *opus sectile* enclosed by a figured frame in black and white mosaic technique.³⁹ Interestingly, the ornamental repertoire employed in this mosaic frame has great similarities to that of the details painted on the ceiling and on the walls of the room (Figure 9.8).⁴⁰ These close stylistic affinities between the mosaic and the wall decoration, and,

³⁷ De Simone (2000: 66); Nappo (2000: 113); Nappo (2001: 891–3).

³⁸ Varone (1996: 686–7).

³⁹ The decoration of this mosaic cornice is as follows: on two sides there is a frieze with pairs of griffons flanking what are either shields or radiate discs. These are crowned with pairs of leaping dolphins and set within a stylized animal protome. On the opposite sides are pairs of griffons flanking lyres. At the centre of each side there are depictions of paired winged figures ending in stalks and stylized masks. The winged figures ending in stalks are repeated in the four corners of the cornice. See Varone (1996: 682–3).

⁴⁰ It looks as if the *musivarii* drew on the same repertoire of decorative motifs as their colleagues the painters. In particular, the pairs of griffons flanking a lyre are repeated in painted form between the architectural frames of the middle zone of the east wall. The winged figures that terminate in stalks are also found in the ceiling decoration and in the 'grotesque' bands painted in the middle zone of the north wall. The motif of the masks ending in stalks is also found in the 'grotesque' bands painted in the middle zone of the north and south walls of the *triclinium* (20) of the Casa del Bracciale d'Oro (VI 17, ins. Occ. 42). More generally, such bands with 'grotesque' motifs were used frequently by the painters of the Vettii workshop. The best preserved examples are those *triclinium* (20) of the Casa del Bracciale d'Oro, the *oecus* (f) of the Casa di D. Octavius Quartio, and room (43) of the Casa dei Dioscuri (VI 9, 6–9), and in the ceilings of portico (1) of the Villa di San Marco at Stabiae. See Aoyagi and Pappalardo (2006: 128–30); Esposito (2009: pl. IX.1–2, XIV.4); Barbet and Miniero (1999: fig. 609).

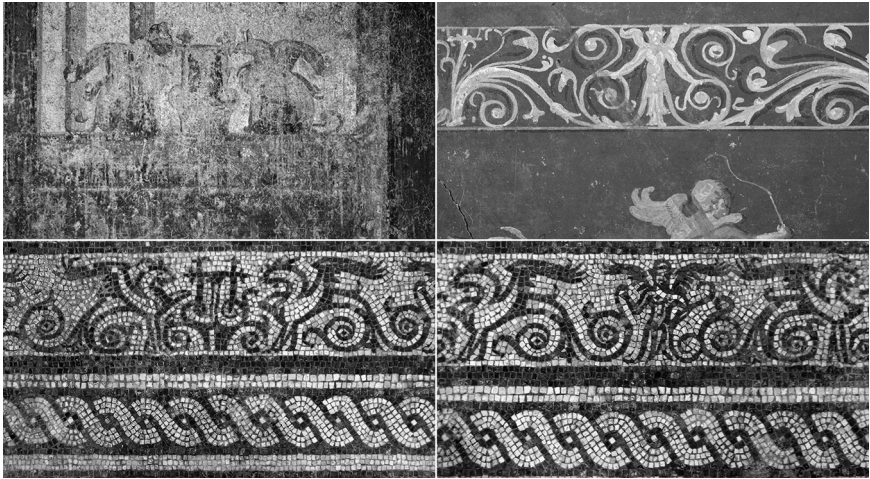


Figure 9.8 Pompeii, Casa dei Pittori al Lavoro, room 12. Top left: east wall, detail with couple of griffins around a vase; bottom left: same motif in the border of the pavement; top right: north wall, detail with winged genie; bottom right: same motif in the border of the pavement. Photo: Domenico Esposito.

in particular, the fact that restoration of masonry structures was also taking place in this house, all tend to support the hypothesis that there was careful coordination between the different craftsmen. Possibly, they worked under the supervision of a single *redemptor*.⁴¹ At the same time, we should not exclude the existence of larger workshops, composed of different teams of workmen and artisans, with masons, mosaicists, painters, and plasterers, which would have been able to accept commissions requiring different types of work.

THE STRUCTURE AND ORGANIZATION OF PAINTERS' WORKSHOPS

In order to better understand the production of wall decoration in the Vesuvian cities and its social and economic implications, it is very important to reconstruct the structure, internal organization, and operation of the painters' workshops. Constructing a catalogue of decoration attributable to a single painters' workshop would allow us to follow its internal development over a number of years. We could reconstruct how the workshop's style

⁴¹ See also the views expressed in Varone (1996: 688).

evolved and changed with reference to the stylistic trends of the period and also other factors, particularly the workshop's engagement with specific commissions.

The study of Pompeian painters' workshops is based essentially on four different interrelated approaches: (i) the observation of technical features in the execution of the paintings;⁴² (ii) analysis of decorative schemes derived from pattern books and different approaches combining both of these; (iii) the regular association of groups of ornamental details with these schemes, which can be considered as indicators of a particular workshop or as the signature of the painters involved; and (iv) recognition of the 'hands' of the painters.⁴³ None of these approaches, taken individually, are new to the field of ancient painting, and for each of them it is possible to draw on a range of authoritative studies.⁴⁴ The problem is that, with few but important exceptions, these different approaches are almost never integrated.⁴⁵

The sheer number of preserved paintings make the Vesuvian cities an exceptional place to study the organization and structure of painters' workshops, especially in the last twenty-five years before the eruption of AD 79. The so-called Vettii workshop at Pompeii is the best-known example, thanks to the large number of well-preserved contexts found. In particular, we have evidence that their painters were at work in the Casa dei Pittori al Lavoro. Varone has hypothesized that at least two painters were working here on the backgrounds and the architectural details of the middle zone, while a third decorator, perhaps less skilled, painted the background on a panel of the middle zone on the north wall. Finally, a fourth painter also worked on the north wall, painting the picture in the centre of the middle zone.⁴⁶ In the Casa dei Vettii it has been possible to identify at least two painters engaged in painting all the ornamental elements (Figure 9.9), as well as many other figurative parts of the decoration, such as the *predella* with cupids in the atrium (c) and groups of winged figures in the salon (q), and the vignettes at the centre of the panels in the middle register of the peristyle (l).⁴⁷ A particularly important point is that these same painters also painted the mythological panels of rooms (e) and (n).⁴⁸ In the Casa dei Vettii, therefore, it

⁴² Much attention has been paid to the way in which the walls were subdivided horizontally and then into vertical bands (reflecting the amount of work that could be done in a single day); to the thickness and composition of the plaster; to the use of preliminary graffiti, sinopia, and methods of copying repeated motifs; to the use of colours of particular quality and rarity, or alternatively the use of a very restricted colour palette of rather poor quality.

⁴³ Esposito (2009: 20).

⁴⁴ For discussion of these studies, see Esposito (2009: 15–20).

⁴⁵ An example of this approach is the study by Peters and Moormann of the paintings of the Casa di M. Lucretius Fronto. See Peters (1993).

⁴⁶ Varone (1995: 133); Varone and Béarat (1997: 213).

⁴⁷ Esposito (2007: 149–55).

⁴⁸ Esposito (2007: 159–62).

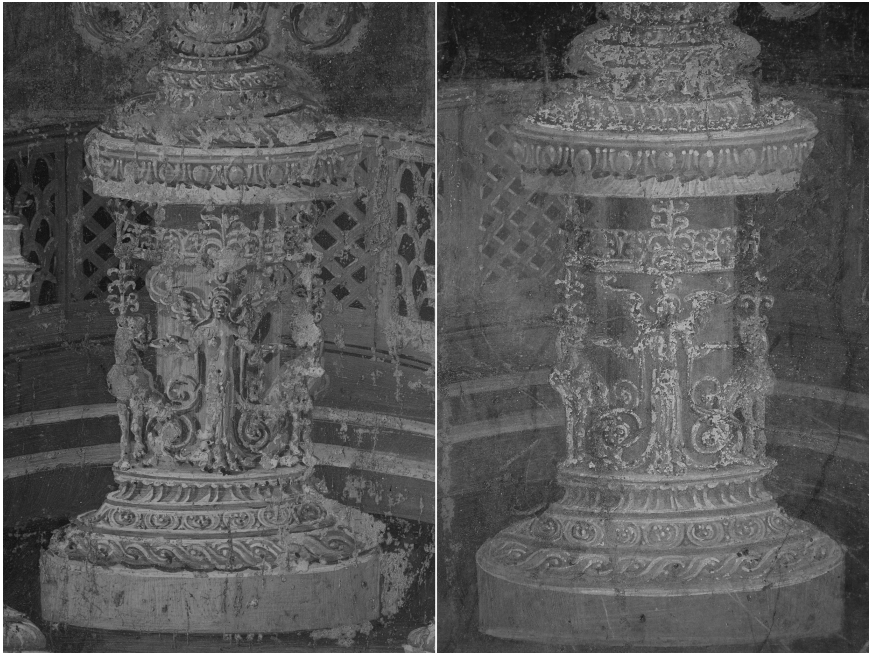


Figure 9.9 Pompeii, Casa dei Vettii, atrium. Same motif executed by two different painters. Photo: Domenico Esposito.

seems clear that the two main painters were able to execute the additional decorative elements and the figurative elements, as well as the mythological panels (Figure 9.10). Only in two cases—in the salon (q) and the *triclinium* (b)—did they limit themselves to painting the decorative scheme with the additional ornamental elements, leaving other painters to paint the mythological panels. The painters of the Vettii workshop have already been identified—from study of the figured panels—by Lawrence Richardson,⁴⁹ who gave them the names the ‘Io Painter’ and the ‘Dioscuri Painter’. They were probably the two main painters of this workshop, and it is possible to recognize their work, both individually and together, in practically all the buildings decorated by the Vettii workshop, while they never appear in houses not decorated by this workshop.⁵⁰ One important point is that these two

⁴⁹ These two painters were first identified and studied in an analytical manner by Richardson in his work on the paintings of the Casa dei Dioscuri. In his first study, Richardson (1955: 116–35, 155–60) had attributed some works by the ‘Dioscuri Painter’ to another decorator, identified by the name ‘Perseus Painter’. Later (2000: 106–13, 122–9), he corrected his own theory, maintaining that the ‘Dioscuri Painter’ and the ‘Perseus Painter’ were in fact the same individual.

⁵⁰ The ‘Io Painter’ worked at Moregine, in the Temple of Isis, the Casa del Bracciale d’Oro (VI 17, 42), the Macellum, the Casa di D. Octavius Quartio (II 2, 2), the Casa di Pinarius Cerialis



Figure 9.10 Pompeii, Casa dei Vettii: two mythological panels realized by the two principal decorators of the Vettii workshop. Left: *triclinium* q, south wall: Apollo. Right: *triclinium* p, north wall: detail of the panel with the baby Hercules strangling the serpents. Photo: Domenico Esposito.

painters painted the ornamental elements of the decorative scheme as well as the mythological panels with the often large vignettes located at the centre of the panels of the middle and upper registers, and the friezes of the *predella*. They were also responsible for the complete decoration of other important buildings intended for public use, such as the complex at Moregine,⁵¹ the Temple of Isis,⁵² and the Macellum (VII 9, 7).⁵³ In several cases, the ‘Io Painter’ and the ‘Dioscuri Painter’ worked on the complete decoration of a room without doing the mythological panels at the centre of the walls. This is what happened in the *triclinium* (p) of the Casa dei Vettii;⁵⁴ the mythological panels for the salon (q)—now lost—were painted in a studio and set in

(III 4, b), the Casa della Fontana Piccola (VI 8, 23–4), the Casa di M. Fabius Rufus (VII 16, Ins. Occ. 22), the Casa delle Pareti Rosse (VIII 5, 37), and the Villa Imperiale. The ‘Dioscuri Painter’ worked at Moregine, in the Casa del Naviglio (VI 10, 11), the Casa dei Dioscuri (VI 9, 6.9), the Casa del Bracciale d’Oro (VI 17, 42), the Casa di Gavius Rufus (VII 2, 16), the Temple of Isis, the Casa dei Vettii (VI 15, 1.27), the Casa della Caccia Antica (VII 4, 48), the Casa di Arianna (VII 4, 31.51), the Casa della Parete Nera (VII 4, 59), the Casa dei Pittori al Lavoro (IX 12, 9), and the Villa di Carmiano at Stabiae.

⁵¹ All the figured elements of the *triclinium* at Moregine were executed by the ‘Dioscuri Painter’, who perhaps supervised the decorative work in the building as a whole.

⁵² The decoration of the portico (1) was probably done by two painters, perhaps assisted by a third decorator, as shown by analysis of the spiral frieze set above the middle zone; cf. Sampaoalo (1995: 202–3). The large panels in the *ekklesiasterion* were probably done by the ‘Io Painter’.

⁵³ The ‘Io Painter’ can justifiably be considered the main decorator of the Macellum, and he may have supervised the decoration of the whole building, as the ‘Dioscuri Painter’ did at Moregine.

⁵⁴ Richardson (2000: 131–2, 143, 145) recently suggested that these panels belong to the last phase of production of the ‘Iphigenia Painter’. This identification is problematic for several reasons. In particular, the personal style of the painter who painted the panels of the *triclinium* (p) seems very different to me, especially in his depiction of the figures, which differs to those usually attributed to the ‘Iphigenia Painter’. Moreover, as can be seen in Richardson’s catalogue, the ‘Iphigenia Painter’ almost never worked in buildings painted by the Vettii workshop (with the

wooden frames.⁵⁵ In a number of buildings we can see that the 'Io Painter' and/or the 'Dioscuri Painter' had painted the figured vignettes and the figures between the architectural perspectives in the upper and medium registers, while another, specialized painter did the mythological panels.⁵⁶

Thus, the Vettii workshop consisted of a fixed team of decorators, among them the important 'Io Painter' and 'Dioscuri Painter'. The two painters often worked in the same building, but also alone, and evidently were called upon to direct different teams of decorators who must have been part of the larger Vettii workshop. In some cases, the painters of the Vettii workshop collaborated with other painters who specialized in creating large mythological panels, such as the 'Achilles Painter' and the 'Tragic Master'/'Telephus Painter'. At other times the panels were made separately and inserted into the centre of a wall that had already been decorated by the Vettii workshop. The current state of research means we do not know if the painters who made the mythological panels were free artisans, or if they were contracted directly by the client, or whether the *redemptor* of the Vettii workshop acted as an intermediary.⁵⁷

The structure of the painters' workshop on the Via di Castricio, first identified by Mariette de Vos, seems even clearer.⁵⁸ This painters' workshop had a repertoire of rather simple and standardized decorative schemes which they used with a certain amount of repetition, with little chromatic variation, and a limited number of decorative additions. It is rare to find figurative panels with these simple decorative schemes. Indeed, panels are usually replaced by *pinakes* and medallions depicting landscapes, still lifes, animals, divine attributes, and so on. The study undertaken to recognize the 'hands' of painters has confirmed that the group of painters making up the Via di Castricio workshop was composed of a fixed nucleus of decorators, none of whom seem to have

possible exception of the *cubiculum* (44) in the Casa dei Dioscuri and the *lararium* of the *atriolum* of the Casa dei Vettii itself).

⁵⁵ Maiuri (1940: 14–16).

⁵⁶ This is the 'Tragic Master', according to Gabriel's identification, or the 'Telephus Painter', according to Richardson's. See Gabriel (1952: 35–50); Richardson (2000: 171–5); Esposito (2009: 28–30). In the Villa Imperiale he painted the panel with 'Theseus abandoning Ariadne at Naxos', while the 'Io Painter' painted the *pinakes* in the frieze. In the Casa di M. Fabius Rufus (VI 16, 20–2) he painted the large mythological panels, while the 'Dioscuri Painter' painted the Muses and the figures between the middle and upper registers. The same painter was working in the *salone* of the Casa dei Pittori al Lavoro (IX 12, 9) at the time of the eruption of AD 79, where the 'Tragic Master' was painting the panel on the north wall while the 'Dioscuri Painter' was painting the groups of figures in flight in the side panels of the middle register. The same organization can be seen in the *tablinum* (42) of the Casa dei Dioscuri (VI 9, 6.9), where the 'Io Painter' painted the groups of figures in flight in the side panels of the middle register, and the 'Achilles Painter' painted the mythological panels.

⁵⁷ The fact that these painters worked with the Vettii workshop frequently leads one to suspect that they had some sort of contractual arrangement.

⁵⁸ De Vos (1981).

specialized in the painting of figurative elements.⁵⁹ Panels are rare and, in the few cases where they were included, they seem to have been painted by a panel painter who was contracted specifically for that commission.⁶⁰ In other cases it seems that a decorator who specialized in *lararium* paintings was used.⁶¹

THE ECONOMIC AND SOCIAL IMPLICATIONS

The painters' workshops active at Pompeii in the last years of the city's life had a well-defined structure with fixed groups of decorators who worked consistently and exclusively within the workshop to which they belonged. The best examples, as seen, are the 'Io Painter' and the 'Dioscuri Painter' from the Vettii workshop and their respective collaborators and assistants, who, we must assume, not least for practical reasons, must have numbered not fewer than four.⁶² The painters' workshop on the Via di Castricio also used several small teams of decorators. At the time of the eruption in AD 79, for example, the painters of this workshop were working in three different houses, I 11, 17; I 14, 1.11–13; and I 8, 6.⁶³ The painting workshops active at Pompeii can thus be characterized as businesses of considerable size. They had a core number of workers that could be increased according to the specific needs of clients, or according to the amount and extent of the work that needed to be done.

The distribution of the buildings decorated by the Vettii workshop and those decorated by the painters of the Via di Castricio shows that their areas of activity overlap almost completely: the difference is not in the topographical distribution of the buildings decorated by the two workshops, but in the quality of the decoration, which reflects two distinct levels of clients.⁶⁴ The Vettii workshop was employed to decorate the main public buildings of the city and worked in the houses of members of the city's elite and notable citizens, but also in some houses belonging to members of the socially and economically emergent classes. By contrast, the painters' workshop from the Via di Castricio

⁵⁹ De Vos (1981) has already emphasized the similarity between the subject matter and the composition of the panels with still lifes painted in certain houses by the workshop of Via di Castricio. Analysis of the brushwork and colours has shown that technical details correspond with the subject matter, signifying work by the same decorator. See Esposito (2009: 133–6).

⁶⁰ Casa dell'Efebo (I 7, 10–12): *triclinium* (17); Casa del Menandro (I 10, 4): *esedra* (4); Casa della Venere in Bikini (I 11, 6): rooms (4) and (10); Casa di M. Lucretius Fronto (V 4, a.11): rooms (4), (6), and (12).

⁶¹ Esposito (2004; 2009: 136).

⁶² For each of the two painters we can speculate that there was at least an assistant and a hod carrier, and for larger-scale commissions (the Macellum, the Temple of Isis, the Stabian Baths, and Moregine) workmen employed from time to time to climb the scaffolding.

⁶³ Esposito (2009: 139–40); I 11, 17: Esposito (2009: 187–9); I 14, 1.11–13: Esposito (2009: 202–5); I 8, 6: Esposito (2009: 222–4).

⁶⁴ Cf. Esposito (2011: fig. 44).

worked for clients who were of lower social and economic status, predominantly members of the mercantile and artisan classes, but also, and significantly, for members of the citizen elite like the Poppaei Sabini, the owners of the famous Casa di Menandro, and rich Pompeians like Iulia Felix,⁶⁵ Cornelius Tages,⁶⁶ and the owners of the villas of Diomedes and of the Mysteries.⁶⁷ Thus, the painters' workshop of the Via di Castricio is characterized by its extreme versatility and its notable capacity to adapt itself to the requests and tastes of a very varied and socially and economically diverse clientele. Very often, the painters of the Via di Castricio workshop were called on to decorate the less important rooms of houses belonging to members of the citizen elite.⁶⁸

It is likely that growing demand for new decoration in the wake of the earthquake of AD 62/3 and the seismic tremors preceding the eruption of AD 79 led to a great decline in the quality of work. The painters of Via di Castricio responded efficiently to the new needs, winning an exceptionally large number of commissions. Their greatest strength was their flexibility. Indeed, this workshop was able to adapt to the tastes of a very diverse clientele, and was able to satisfy this clientele because it was able to modify its 'high' decorative schemes to suit requests reflecting the taste and economic circumstances of its clients.⁶⁹

In this context, it is also worth making some comments about the ways in which models and decorations were spread, both in the public and private spheres. Here too the study of painters' workshops is revealing because it has allowed us to put together a catalogue of decorative schemes that can be attributed securely to different workshops. These decorative schemes were in use over a relatively long period of time, from c.AD 50 to AD 79.⁷⁰ This allows us to compare the buildings decorated by different workshops at Pompeii both in formal and chronological terms, with interesting consequences for the reconstruction of the socio-economic history of the Vesuvian city in the last years of its life.

The workshop that can boast the earliest attestation is that of the Vettii. It is likely that this workshop already existed during the period of the Third Style even if research in its current state has been unable to find any definite connections with the Third Style.⁷¹ For the moment, the oldest decorations that can be attributed to the Vettii workshop are the paintings of the *alae* (h)

⁶⁵ Esposito (2009: 215–22).

⁶⁶ Esposito (2009: 152–60).

⁶⁷ Esposito (2009: 252–3).

⁶⁸ As evidence of this, one can cite the houses of Paquius Proculus (I 7, 1), D. Octavius Quartio (II 2, 2), M. Lucretius Fronto (V 4, a.11), the Vettii (VI 15, 1.27), and C. Julius Polybius (IX 13, 1–3). See Esposito (2009: 146–9, 211–15, 243–4, 247–50).

⁶⁹ Wallace-Hadrill (1994: 167).

⁷⁰ In this way it is possible to follow the internal stylistic evolution of a painters' workshop and how a workshop's style adapts itself to the *Zeitstil*. See Esposito (2009: 54–8, 136–40, 255).

⁷¹ In practical terms this means that it is impossible to identify the points of contact between the painters of the last generation of the Vettii workshop and those of the preceding generation (s). I intend to return to these issues in a future study.

and (i) in the Casa dei Vettii and the paintings of the Villa Imperiale at Pompeii, which can be dated to the years immediately preceding the earthquake of AD 62/3.⁷² In the late Neronian period and early years of Vespasian's reign several of the most important paintings by the Vettii workshop were produced. In particular, there were the Portico dei Triclini at Moregine, dating to between AD 64 and 68, the Macellum, which was also restored between AD 62 and 68, perhaps by the Nigidii Mai,⁷³ and the Temple of Isis, reconstructed in the first years of Vespasian's reign.⁷⁴ These large public monuments clearly provided a model, or at least a source of inspiration, for private clients who turned to the Vettii workshop, commissioning decorative schemes that evoked those of these buildings, albeit with necessary adaptation and variation. A clear example of this can be seen in the decoration of rooms (b) and (c) in the Casa delle Pareti Rosse (VIII 5, 37), in the paintings—now lost—that adorned the atrium of the Casa della Regina Carolina (VIII 3, 14), and in the paintings of the *oecus* (48) of the Casa di Fabius Rufus (VII 16, 20–2). Each of these decorative schemes includes fairly clear references to the paintings in the portico (1) of the Temple of Isis. Frequently in private contexts we see a tendency to monumentalize the middle and upper registers, using a mass of decorative elements, almost as if inspired by a kind of *horror vacui*.⁷⁵ Comparison of the spiral acanthus, populated with animals and cupids, painted on the frieze of the portico (1) of the Temple of Isis with its replica, also the work of the Vettii workshop, in the salon (10) of the Casa di P. Vedius Siricus (VII 1, 25.47), where the pattern of acanthus spirals is even richer and more varied, leads one to such a conclusion (Figure 9.11). Similarly, the decorative schemes used in the Edificio dei Triclini at Moregine and the Macellum are also found in fifteen Pompeian houses.⁷⁶

The close similarities between the contemporary decorative schemes of these houses and those of some of the most important public buildings decorated by the Vettii workshop have been interpreted by Eleanor Leach as an example of the 'big circuits and high powered connections' that existed between the members of Pompeii's elite, who were often directly involved in the restoration and redecoration of the most important public buildings of

⁷² Esposito (2009: 55). The paintings of rooms GG and HH in the Casa di C. Julius Polybius also belong to this phase.

⁷³ Adamo-Muscettola (1992); Romizzi (2006a: 57–70; 2006b; 2007); Esposito (2009: 86).

⁷⁴ Esposito (2009: 56–7).

⁷⁵ Shown in particular in the Casa delle Pareti Rosse and the Casa di M. Fabius Rufus.

⁷⁶ The houses in question are those of the Bracciale d'Oro (VI 17, 42), P. Vedius Siricus (VII 1, 47), the Dioscuri (VI 9, 6.9), the Casa del Naviglio (VI 10, 11), Casa del Adone Ferito (VI 7, 18), the Casa della Fontana Piccola (VI 8, 23–4), the Casa dei Vettii (VI 15, 1.27), the Casa degli Amorini Dorati (VI 16, 7.38), the Casa dell'Ara Massima (VI 16, 15), Casa della Parete Nera (VII 4, 59), Casa di Arianna (VII 4, 31), the Casa della Caccia Antica (VII 4, 48), Casa di Pinarius Cerialis (III 4, 4), the Casa del Centenario (IX 8, 3.6), and house VIII 2, 17–21. See Esposito (2009: 56–8).



Figure 9.11 Top: Temple of Isis, *porticus* 1: detail of the frieze with garlands of acanthus. Bottom: Casa di P. Vedius Siricus, *exedra* 10: detail of the frieze with garlands of acanthus. Photo: Domenico Esposito.

the city.⁷⁷ At the same time, they engaged in a kind of competition to have their own properties decorated by the same artisans who decorated the public buildings. Leach discusses whether public contracts influenced the taste of private clients, encouraging them to engage the Vettii workshop to decorate their homes, or, if the opposite was the case, that the workshop was used by private citizens first, with a leap in quality coming subsequently. In fact, as Leach herself admits, the distinction is not really important, given the structure of Pompeian society in which the elite was engaged simultaneously in a programme of *publica magnificentia* and in calculating political and social self-promotion that was played out in visual images too. From this point of view, if Lucia Romizzi's hypothesis that the Gn. Alleius Nigidius Maius who rebuilt the Macellum was also the owner of the Casa dei Dioscuri is true, it provides an extraordinary example of a close interconnection between the private and public spheres of a prominent member of the Pompeian elite in the last years of the city's life.⁷⁸ A substantially similar conclusion, reached by a different route, is that of Irene Bragantini, who prefers to identify 'productive interconnections' between different buildings decorated by the same artisans.⁷⁹ Similarly, Andrew Wallace-Hadrill has shown how, in the houses of Pompeii and Herculaneum, it is possible to see hierarchical differentiation

⁷⁷ Leach (2004: 262–4); Esposito (2009: 42–7).

⁷⁸ Romizzi (2006a; 2006b; 2007).

⁷⁹ Bragantini (2004: 134–8).

between the decoration of different parts of the house according to the 'social' importance of individual rooms—the highest level of which was achieved in those rooms used by the *dominus* for private receptions.⁸⁰

From all of the approaches discussed, it seems clear that there existed very complex social dynamics in which public and private spheres intertwined and influenced each other, particularly at the higher levels of society. There were also numerous tangential dynamics that resulted in the local elite providing a model to be imitated by the emerging economic and political classes, and by the lower social classes that sought to emulate the members of the higher social levels.⁸¹

With regard to these complex social and economic dynamics, the work of the painters of Via di Castricio seems very interesting. The decorative schemes employed by these painters illustrate clearly the processes by which such schemes were made simpler and more banal by certain workshops to adapt themselves to the needs and the economic circumstances of their clients. The painters of the workshop of Via di Castricio were usually called on to decorate the houses of members of the lower-middle classes, as well as restaurants, shops, and areas used for productive activities.⁸² Only occasionally were they employed to decorate houses belonging to the city's elite.⁸³ In at least two of these it is clear that the painters of Via di Castricio worked *after* the painters of the Vettii workshop had decorated the main rooms of the house.⁸⁴ In other houses it is impossible to establish with certainty the sequence in which the phases of decoration took place, but they must have been close together in time, or even contemporary.⁸⁵

CONCLUSIONS

To conclude, systematic and wide-ranging study of the activities of painters' workshops (admittedly in a solely urban context) is important not just because

⁸⁰ Wallace-Hadrill (1994: 17–37, esp. 31–7); this argument has also been taken up by Tybout (2001: esp. 43).

⁸¹ On this subject, see the opinions expressed in Leach (2004: esp. 211–62).

⁸² Esposito (2009: 134).

⁸³ This was the case for the *praedia* of Iulia Felix (II 3, 4), the Casa del Menandro (I 10, 4), C. Julius Polybius (IX 13, 3), the Casa dei Vettii (VI 15, 1.27), the Casa di Octavius Quartio (II 2, 2), and for the Casa dei Pittori al Lavoro (IX 12, 9) and the Casa di Pinarius Cerialis (III 4, b).

⁸⁴ The Casa di C. Julius Polybius and the Casa dei Vettii. Cf. Esposito (2009: 240–3, 248–50).

⁸⁵ The Casa di Octavius Quartio (IX 14, 4): Esposito (2009: 58–9, 211–15); the Casa dei Pittori al Lavoro (IX 12, 9): Esposito (2009: 119–20); the Casa di Pinarius Cerialis (III 4, 4): Esposito (2009: 61–2, 233–5). In the Casa dei Pittori al Lavoro it is not certain that the workshop working alongside that of the Vettii was that of the Via di Castricio.

it sheds light on how ancient paintings were produced but because it adds to our understanding of the socio-economic system that underpinned this type of production. On a strictly economic level, its huge scale is clear and it can be characterized as a form of 'mass production'. The examples from Pompeii demonstrate that painters' workshops were organized as big businesses, run by *redemptores*, perhaps in the employ of socially and politically influential *patroni*.

Since they were big businesses, these workshops used numerous teams of decorators capable either of working together on the site of a large public building or separately on multiple sites. At a local level, these painters' workshops were able to control large parts of the market, to continually secure new commissions. More rarely, these workshops were able to function on a regional or interregional basis.

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Part IV

Money and Trade

Re-evaluating Pompeii's Coin Finds

Monetary Transactions and Urban Waste in the Retail Economy of an Ancient City

Steven J. R. Ellis

Roman urban economies were extraordinarily complex things. Subject to innumerable forces—social, cultural, political, seasonal, environmental, and many more besides—the range of available evidence for an urban economy might seem limitless. Indeed, there exists an abundance of historical and archaeological data at even the most poorly preserved of urban sites that might help us towards conclusions about economic life at a local, regional, and Mediterranean-wide scale. For all of the information available to us, two of our largest and most ubiquitous datasets for studying the Roman urban economy should surely be coins, which facilitated most transactions of every scale/type, and shops, in which so many of these transactions might reasonably have occurred. The retail landscapes of Roman cities clearly underpinned much of the urban economy; just the number of shops alone, being more common than any other singular type of building, underscores this point. Whether large or small, independently operated or attached to houses of every class, retail outlets played a central role in the operation of the urban economy. Most studies of Roman shops, including my own, have typically been driven by architectural and spatial considerations: their locations and distribution throughout the city, as well as the arrangement of their rooms and fixtures such as their sales counters.¹ Much less is known about their history and development, if only because so few have been excavated (and published). Even less is known about the commodities they sold or, especially, of the coins that facilitated these sales.

¹ For example Ellis (2004a; 2004b; 2005; 2008b; 2011a; 2012); Monteix (2010). For a more strictly historical perspective of Roman shops in general, see Holleran (2012).

The intention of this chapter is to combine a study of two important components of the urban economy—shops, and the coins found in them—via a close look at the excavation of the retail landscape around the Porta Stabia at Pompeii (insulae VIII 7 and I 1; Figure 10.1). The University of Cincinnati has been excavating a group of ten separate properties here since 2005.² At the broadest level I am interested in the construction and operation of these shops, and specifically in how our excavations of so many of them can contribute to our understanding of Pompeii's retail fabric. The 600 or more shops of Pompeii have long been seen as a late arrival in the development of the city, a result of the structural and social rebuilding of the city after it was levelled by the earthquake/s in the early AD 60s.³ The idea that some kind of retail boom occurred at this time can have significant consequences for how we read Pompeii's urban and social economy over time. Even so, there has been precious little discussion that has incorporated archaeological data from the excavation of the foundation deposits of shops to test more accurately when they might have been constructed; the study has instead been limited to what we can determine of the development of these buildings from their standing remains in AD 79.⁴

Beyond ultimately questioning the arrival of shops in the developing history of the city, I first, and especially, want to focus on the coin finds in this area of Pompeii. Few artefacts are as patently indicative of the status and operation of the urban economy as coins, and their subsequent ubiquity is for the most part obvious.⁵ Coins facilitated the monetary exchange associated with the vast majority of economic activities, which in itself is one of the defining hallmarks of a city.⁶ If any proof were needed, urban sites yield higher numbers of coin finds than rural ones.⁷ Little wonder, therefore, that a city as so comprehensively excavated as Pompeii should return one of the highest counts of coins

² See, especially, Ellis (2011d); also Ellis et al. (2011). For more on the project, including a more complete bibliography, see <<http://classics.uc.edu/pompeii/>>.

³ The principal proponent of this idea is Maiuri (1942: 216–7), but most of the discussion is on the supposed rise of a commercial bourgeoisie rather than on a systematic evaluation of the dates of Pompeii's shops. On the association of new, post-earthquake shops with the displacement of the elites, see also Rostovtzeff (1957: 72) and Maiuri (1960: 188); for more on the commercial invasion by an emergent bourgeoisie, from among many see Frank (1940: 252–66); Rostovtzeff (1957: 72); Cerulli Irelli (1974: 74); Castrén (1975: 118–21); Stročka, Grunwald, and Papagialis (1991: 134–5). Opponents of this view have grown steadily in number, for example Andreau (1973: 369–95); Mouritsen (1988: 121–2; 2001: 6); Wallace-Hadrill (1994: 122–31); De Ligt and Garnsey (2012: 83). For a recent and rich overview of these debates, see Monteix (2010: 1–36); cf. also Chapters 7 and 8 (this volume).

⁴ See note 115, on the problematic use of wall types for dating buildings.

⁵ Crawford (1970: 42); Duncan-Jones (1990: 194); Howgego (1992: 29); Hopkins (1995/6: 61); Hollander (2007: 111). For an excellent and recent overview of the ways in which coins can be understood and studied, see Kemmers and Myrberg (2011).

⁶ The best and clearest discussion on coin circulation remains Howgego (1995: 88–110).

⁷ Burnett (1987: 96); Reece (1996: 344–6); Volk (1996: 385).



Figure 10.1 *Insulae* VIII 7 (left) and I 1 under excavation by the University of Cincinnati.

for any individual site. Richard Duncan-Jones' tally of around 33,000 coins for Pompeii demonstrates the size of the total assemblage by comparison with many other sites, as well as something of the scale of the circulation pool of coins at Pompeii at the time of its destruction.⁸ These are the so-called 'stray' coins, or those that were in 'current use'.⁹ More recently, however, a handful of numismatists have taken a healthy interest in examining the coins derived from excavated sub-AD 79 deposits.¹⁰ Chief among these is Richard Hobbs, whose recent book on the coins from the excavations of insula VI 1 at Pompeii provides not just an especially useful catalogue of these newly discovered coins, but also attempts to draw meaning from any apparent patterns in their spatial distribution across the site.¹¹ A systematic approach to coins from stratified deposits and, especially, to their specific find-spots should be of enormous value to both numismatists and archaeologists. The distribution of coin finds across several different types of urban spaces might potentially tell us much about the patterns of coin use in one space or another and, importantly, how those patterns could have varied over time. In attempting this, Hobbs indeed recognized some interesting patterns in the distribution of coins across insula VI 1, such as more coins recovered in the southern and northern ends of the insula, with almost half of the coins coming from commercial spaces.¹² For Hobbs, and doubtless many others, these distribution patterns appear to make perfect sense: the higher density of coins in a particular space 'must be testimony to the largely commercial activities' in that area. One such commercial space is the so-called 'shrine' at VI 1, 13, from which 341 coins were recovered, or about 25 per cent of the total number of coins for the *insula*; excavations here show that it could only have been a shrine in its very latest years, and that for at least two centuries previously there had been mostly commercial and industrial activities in the space.¹³ Hobbs believes that '[e]ven if some of the coins found in the Shrine had been accidentally imported when floors were levelled for new buildings and activities, this surely cannot account for all of the coins found: the only way in which such a large number of coins could have been lost in the area is through close hand-to-hand exchange at high velocity, i.e. for the payment with "small

⁸ His exact number for Pompeii is 32,721: see Duncan-Jones (2003: esp. 163 and fig. 5). This number increases to 39,156 coins when the sites of Herculaneum, Stabiae, and the district around Pompeii are added. More recent surveys, published region by region, will eventually update this number: see Taliervo Mensitieri (2005) on region IX; Cantilena (2008) for regio VI; Giove (2013) for regio I.

⁹ Some of the more fundamental studies on these coins include Breglia (1950); Pozzi Paolini (1975); Dapoto (1987); Giove (1997; 2013); Duncan-Jones (2003; 2007); Andreau (2008).

¹⁰ Stannard (2005); Hobbs (2003; 2005; 2013); Ranucci (2008a; 2008b; 2014); Pardini (2013).

¹¹ Hobbs (2013). ¹² Hobbs (2013: 101).

¹³ See Hobbs (2013: 76) for the number of coins; on the archaeology of the space, Jones and Robinson (2007: 400); Hobbs (2013: 74).

change” for vended goods’.¹⁴ In the attribution of meaning to these numbers of coins and their distribution, monetary exchange and coin loss trumps the incidental incorporation of coins in a levelling fill for a new floor.

The central aim of this chapter is to re-evaluate such a common approach to the stratified coin finds and to demonstrate, via a different but equally very large dataset of stratified coin finds, that rather different conclusions can be drawn. To be clear, any such efforts to integrate numismatic information into our understanding of Pompeii's urban economy are of good value. Even so, what is especially wanting is a clearer and more detailed appreciation of the archaeological contexts from which these coin numbers come.¹⁵ Whereas Jean Andreau has rightly highlighted some of the difficulties that can undermine our interpretations of the AD 79 coin lists of Pompeii, particularly the methods by which the many tens of thousands of coins were recovered, stored, and archived for such a large site that has been excavated by so many people over so many years, no such caveats have been issued for the reading of sub-AD 79 coin finds.¹⁶ Some of the problems are indeed the same, such as the disconnected and uneven excavation, recording, and publication strategies of various international projects in recent years.¹⁷ Equally fundamental to the fate of these coins, or at least our understanding of them, is that the very contexts from which the coins—and any other artefact, for that matter—derive are often unclear or misunderstood; there are those who define context in very loose and broad terms, such as the space in which a coin ‘lived’ and ‘fulfilled

¹⁴ Hobbs (2013: 80).

¹⁵ Collective efforts better to understand and incorporate the contexts of coin finds have increased in recent years. The *Numismatic Chronicle*, for example, began a specific series of short articles on ‘Excavation Coins’ starting in 2003 (vol. 163). Still, most of the articles—with the notable exception of Moorhead (2007; 2008)—are largely catalogues of descriptive information about the coins, rather than anything on the contexts in which they were recovered. The series was not included in the most recent (2011) volume (171). Another series, *Studien zu Fundmünzen der Antike (SFMA)*, publishes extended analyses of coins in archaeological contexts. More recently still, the first volume of the *Journal of Archaeological Numismatics* appeared in 2011, which promises to focus on the contexts of coin finds (Doyen [2011a: iii–iv]). In that same volume, both Reece (2011: 1–8) and Doyen (2011b: 9–46) make good arguments for improvements to be made in the definition and study of coin ‘microcontexts’. The recent burgeoning interest in the archaeology of coins is evident in two recent conferences: one on ‘Context and Contextualization of Coin Finds’ in Geneva, 2010; the other on ‘Numismatica e Archeologia. Monete, stratigrafie e contesti. Dati a confronto’ in Rome, 2011. See also Rizzi (1985); Camilli and Sorda (1989); Vitale (2007); Von Kaenel and Kemmers (2009); and Feugère and Py (2011). On the use of coins as objects in an archaeological assemblage, from among many see Luley (2008); Kemmers and Myrberg (2011); Wynne-Jones and Fleisher (2012). Stroobants and Poblome (2015) appeared after the present chapter was submitted for publication (November 2013) and so its important contributions were not incorporated as would have otherwise been necessary.

¹⁶ Andreau (2008: 209–11).

¹⁷ Some of the recent publications of excavations can be found in Guzzo and Guidobaldi (2005; 2008); Ellis (2011a). See also the preliminary reports found in *FOLD&R* (<<http://www.fastionline.org/>>).

its function as a coin'.¹⁸ For some, the contextual information is wholly misunderstood,¹⁹ while for others it is rarely necessary.²⁰ There are some who have a clearer understanding of the various types of contexts in which coins were found, but not of how coins came to be deposited in them.²¹ Often the context of each coin is unpublished, or the number of the context is provided in the catalogue but without any kind of contextualization via a Harris Matrix.²² This renders the context number as a fairly meaningless label that points to nothing.²³ At the simplest and most common level, the location of a coin find seems often to be mistaken for its actual systemic context.²⁴ But, as will be demonstrated in this chapter, it is not so much the type of building within a city, or room within that building, that is of the highest level of importance for knowing the context of a find, but rather the specific depositional process that caused the coin to be found in a particular location. Context is more properly the physical result of a depositional process or event in which a coin or object is located, rather than merely the location itself. It is only through the recognition of these depositional processes that we can begin to understand the archaeological context of a coin find, the result of which can turn many of the conventional readings of coin finds on their head.

What follows is a different approach to the densities and distributions of coin finds, one that necessarily privileges the archaeological context of these types of assemblages and questions more deeply how and why coins came to

¹⁸ Von Kaenel (2009: 20).

¹⁹ For example, Hobbs (2013: 77–9), who interprets the various layers of fills in two decommissioned subterranean tanks in two different, but both highly problematic, ways: one of the tanks is seen to have been filled by successive occupation layers, which could only be so if the tanks were filled, bit by bit, over a long enough period of time for those layers to have represented a meaningful sequence of events and activities (the tank, as practically all others of its kind, was instead surely filled as a single event, a process that usually produces various layers of stratified, but chronologically and functionally indistinguishable, fill). A second tank was conversely described as being filled in a single event because of the mixed nature of the coinage, which is equally implausible.

²⁰ Metcalf (2012: 8).

²¹ Just one recent, but of many, examples is Beliën (2009: 78–80), who discusses the coins from the Roman army camp at the Kops plateau in Nijmegen.

²² See Beliën (2009: 74), whose study of coins in context was severely limited by the failure of the excavators to provide a Harris Matrix because such a task was considered to be not worth the time.

²³ Martos (2006: 405–18) is just one example of a recent report on coins from a stratified excavation for which no contextual information beyond a number/label is provided for the coin finds.

²⁴ Several of the contributions in Von Kaenel and Kemmers (2009), one of the most recent collected volumes dedicated to coins and their contexts, confuse location and site for archaeological context. For example, Kaczynski and Nüsse (2009: 96–7) treat all of the coins from hoards and temples and a vicus as their own separate, collective 'context'; similarly, Feugère and Py (2011). See also Kemmers (2009); Doyen (2011a; 2011b); Reece (2011). The distinction between systemic and archaeological contexts is explored in the section: 'Can We Correlate Monetary Activity to Coin Loss and to Coin Finds?'; for now, Schiffer (1972).

be where we find them. The focus of this chapter is thus not on the specific types of coins we have found in these shops and buildings, and what these details might indicate about denominations, minting, and circulation.²⁵ As an archaeologist, not a numismatist, but with an interest in coin finds, my aim is instead to report on the extent to which coin contexts can inform us of the creation and operation over time of retail spaces, and how any patterns in coin distribution—spatially across the two *insulae*, as well as chronologically over time—can lead us towards new information about the economic history of the city. The intention is not simply to scramble the overly positivist readings of coin find patterns, but rather to elevate context as the central factor in the interpretation of find-spots and to appreciate the archaeological value of these inherent complexities. Beyond the presence and purpose of coins in retail outlets, the chapter explores other questions of urban waste and its reuse in the construction of these properties. It is thus about seemingly different but deeply related things too often treated in isolation: coins and their find-spots, archaeological contexts and their depositional processes, and ultimately how stratified coin finds can relate to our understanding of the development of Roman urban retail economies. Given the marginalization that is often associated with the specialized study of specific objects, in this case, and perhaps (in)famously, coins, this chapter is, in a small way, a response to an important call for greater engagement between numismatists and archaeologists.²⁶ To be fair to the numismatists, they have made many more attempts to reach out to archaeologists on how to handle numismatic data better.²⁷ Where the archaeologist can return the favour is by establishing a clearer, re-evaluated understanding of how those coin finds came to be there in the first place.

THE COINS OF VIII 7 AND I 1

The coins in this study were recently uncovered by the Pompeii Archaeological Research Project: Porta Stabia (PARP:PS).²⁸ These excavations, of no less than forty-one trenches (about 835 m²), covered a neighbourhood of two

²⁵ More detailed and ongoing studies of the coins themselves are being led by Dr Giacomo Pardini, head numismatist for PARP:PS; see Pardini (2013).

²⁶ Many have addressed the lack of communication between the two groups, for example Johnston and Buttrey (1981); Kent (1988); Clarke and Schia (1989); Rotroff (1997: 11–12); Sheedy and Papageorgiadou-Banis (1997); Reece (2003: 3); Doyen (2011a); Kemmers and Myrberg (2011); Visonà (2013: 775–6).

²⁷ Reece (1996); Reece (2003); Doyen (2011a); Kemmers and Myrberg (2011).

²⁸ PARP:PS is an excavation of the University of Cincinnati, under the author's direction. See note 2.

insulae (VIII 7 and I 1) with ten separate building plots (Figure 10.2).²⁹ These properties contained at least seventeen (or perhaps as many as twenty) shopfronts, which makes them the largest number of excavated shops at Pompeii.³⁰ The character of the neighbourhood was distinctly sub-elite: not a single atrium house was located here, which is unusual for such a large expanse of Pompeii's urban network. Instead, seemingly more modest domestic, production, and retail spaces occupied this area of the city. Over the course of eight seasons, PARP:PS recovered a total of 1,039 coins. None of these coins could reasonably be considered part of a hoard; they were instead 'single finds';³¹ these are typically considered to have been those low-denomination coins once dropped, unintentionally, and lost, whereas 'hoards' are typically of higher denomination, a greater number, and intentionally deposited.³² The coins were recovered from hand-trowelled contexts, all of which were screened (1 cm mesh). Some were recovered from the wet-sieving of very specific, organic-rich contexts. The significant scope of the project and of its excavation and recording methodologies—and perhaps the nature of the buildings being excavated—means that this total number of coins is ultimately one of the largest to be recovered in the history of excavations at Pompeii.

Just these numbers alone, however, are not enough to say much of value about coin use and coin finds at Pompeii, or of the value of studying them from archaeological contexts. In the first instance they need to be broken down into logical groupings, and it will be the comparison of these to each other, as well as to other sites, that can reveal illuminating patterns in the distribution of stratified coin finds at Pompeii. This is not without some difficulty at both a practical and theoretical level. Some numismatists, for example, have (perhaps rightly, or pessimistically) cautioned against overplaying the significance in the striking differences that can exist in the absolute numbers of coins recovered from one site or another.³³ The highly varied nature of coin loss, survival, and recovery are sometimes thought to be too incomparable; Mark Blackburn, while speaking of medieval urban sites (although his point is of course applicable for our current focus), laments that 'it only requires one trader who is consistently clumsy, or a single event such as a stall being upset or a purse being scattered, to affect the pattern of

²⁹ Six in *insula* VIII 7, being: VIII 7, 1–4; VIII 7, 5–6; VIII 7, 7–8; VIII 7, 9–11; VIII 7, 12; VIII 7, 13–15. Four in *insula* I 1, being: I 1, 1.10; I 1, 2; I 1, 3–5; I 1, 6–9.

³⁰ On shopfronts and street-side doors in the Roman world, see Ellis (2011b).

³¹ While 12 coins were found as a clump, these were most likely a (rather rare) ritual deposit, found as they were packed into the construction fill for the foundation of a principal wall of VIII 7, 1–4.

³² For the most recent treatment on single finds (versus hoards, for example), Butcher (2013: 1). See also Kemmers and Myrberg (2011: 101–3).

³³ Howgego (1992: 2–4).



Figure 10.2 The location of trenches at VIII 7 and I 1.

finds dramatically'.³⁴ The benefit of the PARP:PS dataset is that it derives from the stratified excavation of as many as ten separate but neighbouring properties from two Pompeian *insulae*, all of which were excavated under the same methodological conditions. But first we have to look at the numbers of the coins themselves before we can question what they mean, why we have them in the first place, and how they can most appropriately inform us about urban economies.

At the broadest level, the total number of coins (1,039) can be broken down to a number for each *insula* (excluding, if only for the purposes of comparing *insula* to *insula*, building to building, those we recovered from outside VIII 7 and I 1).³⁵ That 499 were recovered from the excavations of VIII 7, and 509 from I 1, is immediately of interest given the supposed balance between the two totals, but the similarity is misleading given that more trenches were excavated in VIII 7 than in I 1: that is, twenty-five trenches were excavated within VIII 7, and eleven within I 1.³⁶ A glance at the layout of these trenches further shows that some were as much as 8–10 times the size of others (Figure 10.2). A common denominator is thus needed to normalize the statistics of coin finds and to render one trench more reasonably comparable with another. This can be done in at least one of two ways, neither of which is infallible. The first is simply by the total area of the extent of each trench, the result from which can qualify overly broad statements like 'this trench had more or less of one thing than another', simply because much more (or less) of it was excavated. It also renders, albeit problematically because of this scale, this study more directly comparable with other studies that have published their numbers of coin finds as a measure of area excavated;³⁷ for the vast majority of published coin finds from Roman urban sites, the number of coins per area excavated represents the furthest extent of statistical analysis and the normalization of the finds. But the surface area of a trench on an urban site does not account for how much of that space was in fact excavated. The second measure, being the excavated volume of a trench, and thus of its

³⁴ Blackburn (1989: 18). Blackburn further believes that quantitative swings, even of up to 50%, can be of no real significance because of the issues of loss and recovery. Moreover, Evans (2013: 112) draws the rather bleak conclusion that the number of variables in coin loss, survivability, and archaeological retrieval and preservation means that little can be said about circulation from the discovery of these 'random' or 'scattered' finds.

³⁵ A total of thirty coins were recovered from our two trenches located in the eastern pavement within the Porta Stabia (five coins from Trench 10000 and twenty-five coins from the much larger Trench 14000), while just a single coin was recovered from the small trench (Trench 20000) excavated between the northern limit of VIII 7, 15 and the Odeon. For those excavations, see Ellis and Devore (2006: 12; 2008: 317–19 [Trench 10000]); Devore and Ellis (2008: 11–15 [Trench 14000]); Ellis and Devore (2009: 15–17 [Trench 20000]).

³⁶ It should be noted that Trenches 4000 and 30000 saw mostly cleaning of the topsoil rather than deep, stratified excavations.

³⁷ For example, Hobbs (2013: 103, fig. 19).

various parts (from individual stratigraphic units, to the groupings of them as phases) might thus seem to be a more complete and realistic measure. From known volumes we might then reasonably measure the varying densities of certain artefacts such as coins. At the first level, however, the establishment of volume as a statistic 'is a long way off' for most published sites,³⁸ and is, in any case, an idealized measure that has some failings.³⁹ The inherent problem with volume and density counts is that they risk an assumption that the excavated contexts, and materials that constitute them, were more or less of the same purpose. The reality is that the deposition of these contexts were created under dissimilar circumstances, (thus) not necessarily of a similar matrix and ultimately inconsistently comparable, particularly when we look at the many numbers of them that made up a phase for any one trench; contexts were not created equally. Some phases of urban development, for example, are overly represented by high-volume levelling fills in one trench or room or building, whereas the contexts of a contemporary phase elsewhere might be made up of fills of a wholly different matrix. Thus, for some contexts, we are able to compare densities of finds at a more micro-scale, such as on a one-to-one case, but at the level of a phase or a room or a building, most often made up of many multiple contexts, the task is less helpful and its effort often beyond reward. For the purposes of this study, therefore, which will compare large datasets from many urban contexts, and will focus on spatial and chronological patterns (i.e. room to room, and building to building, as well as phase to phase), it might be more meaningful to arrive at a count of coins per space and per phase.

With the numbers broken down as reasonably as possible, it is now possible to discern some clear patterns in the distribution of coin finds across the excavated areas of insulae VIII 7 and I 1. The first for discussion is an immediately recognizable spatial pattern; the second will be a chronological one based on the number of coins from within each context and from among the phases of urban developments across the neighbourhood.

SPATIAL PATTERNS IN THE DISTRIBUTION OF COINS AT VIII 7 AND I 1

At the broadest level, on average about twenty coins were found in each trench of VIII 7, whereas close to fifty coins were found in each trench of I 1. While these averages show that more than twice as many coins were recovered in the

³⁸ Fulford (1996: 163).

³⁹ See Reece (1996: 344–5) on the idealized measure of volume.



Figure 10.3 The total number of coins recovered from each trench. Note the increased numbers along the street front.

trenches of insula I 1, this striking statistic requires the numbers to be more finely honed given that some trenches were not just of different sizes but in certain locations; indeed, it is the stark *differences* between one trench in which over a hundred coins were found (Trench 50000 with 102 coins) and another (say, Trench 15000), in which just three were found, that can suggest that the average distribution of coins at this level is too misleading and might be better evaluated on the basis of location. If we look at the actual numbers for *each* of the trenches across both *insulae*, it is apparent that the most overt spatial pattern is in the number of coins recovered from within those trenches along the street front, which mostly represent shops (Figure 10.3). That is, 701 coins were recovered from just the street-front trenches alone, 70 per cent of the total assemblage; this pattern is as striking for both *insulae*. In VIII 7, for example, twice as many coins were recovered from within shopfronts than in the rooms further to the rear of each property (313 of the 499 total coins in that *insula*, or 63 per cent; this is about 35 coins per street-side trench). For I 1, the numbers are higher still, with three times as many coins being found under the shopfronts than were recovered from the rear of these premises (388 of the 509 total coins in that *insula*, or 76 per cent; this is about 65 coins per street-side trench). Exceptions exist of course, as they do for many statistical patterns across a large urban site, with one of the highest number of coins coming from a back room in VIII 7, 9–11 (Trench 19000 with sixty-two coins).

CAN WE CORRELATE MONETARY ACTIVITY TO COIN LOSS AND TO COIN FINDS?

The explanation for why so many more coins came from one *insula* than another, and in both cases from mostly the street-front spaces, is seemingly a simple and immediate one: that the coin finds represent more frequent monetary transactions in the street-side shops (especially those in I 1), causing more coins to be lost in these spaces and thus recovered in our excavations. The number of coins recovered from any one space, or trench, is commonly pinned on the use (and consequently loss) of those coins in that space. This kind of direct correlation in the distinctive coin find patterns that have been recognized between rural and urban sites, for example, in which the relatively higher urban counts are directly related to greater monetary transactions, makes good sense.⁴⁰ At a more localized level, for example within cities, distinctive patterns have been recognized in the number of coin finds between

⁴⁰ See note 8.

domestic and commercial spaces.⁴¹ Again the cause is typically pinned on the presumed higher occurrence of monetary transactions. Narrowing the focus further still, for example to account for coin finds within specific types of properties—commercial or domestic or otherwise—the same model of coin correlation has been used to explain the presence of coins among the finds assemblages between one room or the next. Most directly comparable to the PARP:PS assemblages, for example, are those coins recovered in the recent excavations of insula VI 1 at Pompeii by the University of Bradford and published by Richard Hobbs.⁴² Across that *insula*, certain patterns were recognized in the number of coin finds, which he directly related to ‘the functions of different parts of the block’.⁴³ Hobbs is convinced that the coins recovered in those excavations relate to specific patterns of coin loss among the various properties and that such a ‘pattern of coin loss must relate to the fact that the commercial areas, be they bars or workshops, were the areas where the most daily transactions were taking place so were the most likely areas for “small change” to be accidentally dropped and trodden into the ground which eventually formed the archaeological record’.⁴⁴

There is nothing particularly new and unusual in this kind of association between a finds assemblage, its find-spot, and the use of that space in antiquity.⁴⁵ There exist practically countless archaeological reports and synthetic studies in which the distribution patterns of certain types of artefacts—coins or otherwise—are (often appropriately) used to determine the function of those spaces.⁴⁶ Even so, it is a premise that needs to be wholly re-evaluated. First, why should the presence of an artefact within a trench or a space mean that it had

⁴¹ See Kemmers (2006); Hobbs (2013). The recovery of coins in higher proportions in places of higher transactions, like commercial properties, is equally and unsurprisingly registered for sites from the Middle Ages: see Coppergate in York (Pirie et al. [1986: 15–29]), and Flaxengate in Lincoln (Blackburn, Colyer, and Dolley [1983]).

⁴² Hobbs (2013); Chapter 11 (this volume).

⁴³ Hobbs (2013: 101).

⁴⁴ Hobbs (2013: 103). On the greater likelihood of coins being dropped in markets etc., see Casey (1986: 81).

⁴⁵ For a recent, similar reading of a stratified assemblage in a shop that contained coins and bones, see Anderson et al. (2012: 19): while the assemblages are directly linked to the space in which they are found, the actual context for their being there is unclear. See also Bon et al. (1997: 44); Carafa (1997: 21). Cf. Baird (2007: 420), who has documented the recovery of coins from shops at Dura Europos, but rightly questioned the (unrecorded) contexts in which they were found. Perhaps the most egregious errors of taphonomic understanding can be found in Murphy, Thompson, and Fuller (2013). Their study of the food refuse from different types of property at Pompeii associate the ‘contexts’ of their assemblages directly and *only* to the types of property in which they were recovered. The level of contextual information is thus no more refined and meaningful than the (latest) property identification of commercial or domestic etc. So, regardless of whether an assemblage was recovered from a terracing fill or a waste pit or a ritual deposit (the authors never tell us), the finds and their contexts are given the same identification as the supposed latest function of the entire building.

⁴⁶ As an example, the many contributions in Lavan, Swift, and Putzeys (2007a); the introductory chapter by Lavan, Swift, and Putzeys (2007b) is especially useful, as is Williams (2013). See also Allison (1997; 1999); Allison et al. (2005).

been actually used there? Related to this, why should we find more coins in shops than in other types of buildings? My questions are not to doubt that correlations can exist between archaeological find-spots and the function of that space in antiquity.⁴⁷ Nor are they to doubt that monetary transactions occurred in greater frequency in shops as compared to houses, and that coin loss was thus equally higher in such places; indeed, my ultimate reading of the coin contexts is based on the very premise that they were indeed dropped and lost in the first place. Moreover, the denominations of the PARP:PS coins follow a fairly typical pattern of coin loss: the vast majority was of a low value, not unlike the assemblages of coins recovered from other archaeological sites, whether across Pompeii or elsewhere.⁴⁸ The problem as I see it lies not so much with the coins themselves, and their find-spots, but with the common disregard for the contexts in which they are found and the presumptions that are built into the model itself of coin loss: principally, that there is a direct correlation of monetary activity to coin loss, and of coin loss to coin finds.

This is much to do with the archaeology of dropping and losing things, the differences between systemic and archaeological contexts, and the premise that the coins we find inside shops are, of necessity, the same coins that were dropped in those spaces. While there exist important distinctions in the definitions of coin loss, such as (semi-)intentional (hoards etc., often intentionally deposited but not subsequently recovered) and unintentional coin loss,⁴⁹ the models we have for unintentional coin loss (the stray coins) are typically oversimplified and do not always account for a more complete range

⁴⁷ A good example from the medieval world is outlined in Wynne-Jones and Fleisher (2012: 28).

⁴⁸ One of the best illustrations of the tendency for low-denomination coins to form the majority of unintentionally lost coins comes from the Athenian Agora. Of the more than 54,000 coins recovered over sixty years of excavation at the Agora, for example, no more than three were gold coins, with only around three hundred of silver: Rotroff (1997: 9). Moreover, Stannard and Pardini (2011) have convincingly shown that the majority of small denomination coins at Pompeii were from the 'pseudo-mints' (of about 140/130 BC), and of the Augustan aes (which somewhat replaced the pseudo coins of Ebusus and Massalia); on these pseudo-Ebusus and pseudo-Massalia coins, see especially Stannard (2005); Stannard and Frey-Krupper (2008); Stannard and Carbone (2013); and Ranucci (2014).

⁴⁹ Intentional losses are those coins that were probably placed in their contexts as hoards or as votive deposits. While rarer than unintentionally lost coins, they can be recovered in contexts that are often clearer to understand—in small pits, with other objects, and in small to large groups rather than as scatters. Unintentionally lost coins are those that are thought to have been dropped and not recovered for any number of imaginable reasons. These are typically more commonly recovered on archaeological sites, and usually represent coins of a lower purchasing value. See Crawford (1983: 202); Howgego (1995: 105–6).

On the definitions of intentional and unintentional coin loss, see Evans (2013: 110–11); for hoards and other intentional deposits, see Kemmers and Myrberg (2011: 101–3); Metcalf (2012: 6–7). On lost objects more generally, see Schiffer (1987: 76–9; 1995: 175). On the probability that an object could be lost in the first place, as well as not being retrieved by its user or owner, see Fehon and Scholtz (1978).

of depositional circumstances.⁵⁰ The conventional model of unintentional coin loss, and so the types of coins that we are currently interested in, is so simple that it has largely gone unchallenged, in spite of it being largely improbable. A composite of the model of coin loss is as follows:

A coin is dropped in hand-to-hand exchange during a monetized transaction, more commonly in a retail environment than elsewhere; given the nature of the retail space, the probability of the dropping of coins in this way will happen repeatedly. The coin falls to the ground and, for it to be deemed lost, it either rolls across the floor (perhaps under something) and is now out of sight, or is (now or eventually) trodden into the earth and, being camouflaged, is lost from sight; given the probable low denomination of the coin, the dropper may not know or even care that it has dropped from possession, but rather consider its value to be less than the effort deemed necessary to recover it. In any case, neither the dropper nor anyone else locates (purposefully or otherwise) the coin and then decides to recover it. The coin thus remains in that space for weeks, years, decades (!) without ever being found—all the while as, for this model to work, other coins in the operation of the shop are also being dropped, searched for and recovered or lost—until that space is ultimately rebuilt, abandoned, or destroyed. In the case of the stratified phases at Pompeii, the rebuilding of the space ‘entraps’ the coin within that phase;⁵¹ in spite of the physical nature of this last process, the coin, and the many others now lost in this way, continues to escape recovery. There it remains until being recovered through archaeological excavation, whereby the coin now, and especially if others are found near it, provides a direct correlation between its find-spot, its loss, and thus the definition of the use of that space as a retail area with a (higher than elsewhere) volume of monetized transactions.

For this model of coin loss to correlate meaningfully with the types of properties in which we find them, we might reasonably expect to see any such pattern mirrored in the AD 79 surface assemblages; of course, given the nature of the destruction, the pattern should be at least as striking, if not more so.⁵² Surely the distributions of both stratified excavation coins and surface finds from the AD 79 eruption need to map similarly for the model of coin loss to work. Such a comparison can be done, but it is not without its problems: in different ways to the pre-AD 79 contexts, the record of the AD 79 find-spots is so wildly inconsistent at best, and often wrong or even entirely lost;⁵³ while many

⁵⁰ While we may not yet have a model of coin loss, Reece has argued that there is at least a pattern for it, and one that follows a ‘general British pattern’. Reece (1996: 342–4). See also Casey (1986: 68–79); Volk (1996: 383).

⁵¹ On coin ‘entrapment’, Volk (1996: 389, 394–8).

⁵² For an excellent overview of the coins from the AD 79 contexts, see especially Taliercio Mensitieri (2005, but also 2001; 2003). For other principal treatments, see note 10. Beyond the AD 79 coins at Pompeii, see the ‘catastrophe’ coins and finds from Kalkriese. On these, see Berger (1996); several contributions in Lehmann and Wiegels (2007: 113–60); von Kaenel (2008: 227–43).

⁵³ Andreau (2008: 209).

hundreds of coins might be registered within a single property, no more than nine coins, for example, can be counted for all of insula VI 5.⁵⁴ Do these differences reflect meaningful distinctions from antiquity, or are they just the meddlesome accidents of archaeological survival? In any case, some of the clearest studies of Pompeian coin finds demonstrate an equally pronounced, yet altogether different pattern of coin distribution, whereby more coins are recovered from houses than shops. Marina Taliercio Mensitieri has recently determined that no less than 44 per cent of all of the coins across the three regions of VII, VIII, and IX were from houses, with 38 per cent coming from shops and workshops combined.⁵⁵ Given that many more of the properties in these regions were shops than houses (Taliercio Mensitieri believes as many as 70 per cent of all properties were commercial, while just 28 per cent were domestic),⁵⁶ these figures equate to there being proportionately up to three times as many coins found in houses than shops. Taliercio Mensitieri also found that the pattern was even more striking within regio IX, where she found that 2,123 coins (58 per cent of the total)⁵⁷ were discovered in houses, which is close to twice as many as those (1,175, or 32 per cent)⁵⁸ found in shops and workshops. Another study on region VI, by Renata Cantilena, accounted for 3,257 coins from domestic properties, whereas scarcely a third as many—1,011—were uncovered from shops and workshops.⁵⁹

A more direct comparison of these tallies can be applied to the excavated *insulae* that form the focus of this chapter—VIII 7, I 1, and VI 1—to see if any similarities can be drawn in their distributions that might shed light on coin loss patterns. For insula VI 1, again many more coins were recovered from houses than shops. Of the 240 coins found in that *insula*, 119 (about 50 per cent) were found in the Casa delle Vestali (VI 1, 7) alone;⁶⁰ oddly enough, just a single coin was reported from the Casa del Chirurgo (VI 1, 9–10), which recalls Andreau's caveats for the veracity of these records.⁶¹ The three shops in the south of the *insula* yielded thirty coins.⁶² Such sharp contrasts between the domestic and commercial spaces are harder to discern in the *insulae* of VIII 7 and I 1, where the types of buildings seem to be either of a more mixed use or dedicated to retail space in AD 79. Even so, approximate locations can be plotted for as many as 553 coins across both *insulae* (Figure 10.4).⁶³ No less

⁵⁴ On the coins from VI 5, see Bonghi Jovino (1984: 69–70).

⁵⁵ Taliercio Mensitieri (2007: 34).

⁵⁶ For these numbers, see Taliercio Mensitieri (2005: 9).

⁵⁷ Taliercio Mensitieri (2005: 113). ⁵⁸ Taliercio Mensitieri (2005: 135).

⁵⁹ Cantilena (2007: 188), repeated in Cantilena (2008: 81).

⁶⁰ Cantilena (2008); summarized in Hobbs (2013: 21).

⁶¹ Andreau (2008: 209).

⁶² Hobbs (2013: 21) lists four in VI 1, 2.4, ten in VI 1, 17, and sixteen in VI 1, 18.

⁶³ I am grateful to Aimée Scorziello and Ambra Spinelli, archivists for PARP:PS, for their diligence in reconstructing these (and other) finds lists. On regio VIII in general, see Taliercio Mensitieri (2007); on regio I in general, see Giove (1997; 2013).



Figure 10.4 The distribution of AD 79 coin finds across VIII 7 and I 1.

than 437 of those coins were found as a single stash in the courtyard of I 1, 7–8. If we remove those as an exceptional find, arguably a hoard, then we are left with forty-two coins from all of VIII 7 and eighty-one for I 1. Apart from there being many more coins in I 1 than VIII 7, which might be explained by the simple fact that I 1 was, for the most part, excavated more recently than VIII 7, and so arguably with greater precision and clearer records, there is clearly less of a spatial pattern to the rate of recovery in coin finds from one property to another. In any case, the more important point is that the discernible record for surface finds is wholly different from that known from the stratified finds.

If the numbers and distributions of coins from the AD 79 contexts do little to support the theory that coin finds are a direct result of coin loss in any given location, then what good are the numbers in the stratified layers? Surely they should be weaker still, given the nature of their contexts? Indeed, not only are the numbers actually rather limited, but so much so as to make one wonder how they could ever have been drawn on to forge this paradigm in the first place. For coin loss to be a meaningful phenomenon, for example one common enough to shape an archaeological record or to at least be detectable in associable distribution patterns, we should probably expect to find many more coins than we actually do. Yet, at the most basic quantitative level, we have only recovered about a thousand coins for about 250 years of monetized activity across two town blocks.⁶⁴ Per *insula* that is about two coins being dropped and unrecovered for an entire year(!). This (in)frequency is not unusual: Hobbs accounted for less than two coins per year for the commercial phases beneath the so-called 'shrine' at VI 1, 13,⁶⁵ and, likewise, fewer than two coins per year of occupation were recovered from the excavations at Cosa.⁶⁶ Even if what archaeologists recover can only be a minute fraction of the actual number dropped and lost, if coins were being lost from hand-to-hand transactions in shops, and I have no doubt that this indeed happened, and at a rate that was frequent enough to dictate the cause behind our recovery of them in these spaces, then the loss and failed recovery in antiquity was a phenomenon that was so incredibly rare as to raise significant suspicion of the model itself.

CONTEXT, CONTEXT, CONTEXT

The problem as I see it is not just a matter of defining a model of Roman coin loss that can correlate to the excavated coin assemblages from Pompeian

⁶⁴ On the infrequent occurrence of coins in excavated contexts, see Casey (1986: 82).

⁶⁵ Hobbs (2013: 80).

⁶⁶ Brown, Richardson, and Richardson (1993: 238); Hollander (2007: 115–16). See also Kemmers (2006: 141) for the low number of dropped coins at Canabae.

shops, but rather the extent to which the contexts themselves, from which these coins derive, have anything at all to do with a primary 'occupation/use phase' activity in which the coins were lost. This is not so much a matter of defining if the context of a recovered coin comes to us from a shop or a house or a temple, but rather an issue of understanding the actual taphonomic and depositional context in which the coin was recovered. Simply, the reality is that archaeologists do not typically recover these coins from on top of a floor, lying where they once dropped and having never been found by the owner or someone else (and over the many years that floor might have been exposed), or even within the cracks of a floor or trodden into a rock-hard, beaten-earth surface. They are instead, and this is the critical point, most commonly recovered from within construction fills.⁶⁷

At issue is the actuality of what constitutes the volumetric matrix of an archaeological site, its formation processes, and the contexts for the finds associated with these developments. In spite of the vast range of the types of archaeological contexts uncovered in the stratified excavations at Pompeii—and given that we are not here dealing with the same kind of abandonment contexts as are omnipresent at more typical archaeological sites—many of those contexts that contain artefacts can be broken down from the various classifications into just two inclusive groups: those that were deposited as part of the construction/creation of the space or room or building (the terracing and levelling fills, subfloors and floors, and fixtures, etc.) and those that were a product of the use or occupation of that space (the fills from waste pits and drains, or from intact votive deposits, etc.). The distinction between these two groups, often seen as primary and/or secondary/tertiary, is instrumental for reading the site and its development over time, and immeasurably vital for determining the context, and thus interpretative value, of the artefacts recovered from the trench; the depositional contexts of artefacts recovered from ritual deposits, for example, are significantly different from those found in the levelling activities of subfloor deposits. As simple as these distinctions are, many studies of Pompeii's sub-AD 79 artefact assemblages, even recent ones, have too commonly neglected these fundamental contextual distinctions, or have presumed that the assemblage in question must have been directly associated with a primary context.⁶⁸ Construction fills, however, form the vast majority of excavated contexts on stratified, multiphased urban sites like Pompeii. The sub-AD 79 floor surfaces—or at least portions

⁶⁷ On the lack of 'universal systematics' or an 'appropriate collective methodology' among numismatists for studying coins in context, see Von Kaenel (2009: 9). On coins being found within floor fills, see the examples from Lattara in Luley (2008: esp. 180–2). For discussion of the idea that objects are typically 'cleaned up' from activity areas, and that the penetrability of the floor's matrix determined the likelihood of artefacts entering the archaeological record, see LaMotta and Schiffer (1999: 21).

⁶⁸ See note 46.

of them—survive, but it is only in the rarest of cases that artefacts can be recovered from their surface that were in actual association with its use; so destructive are later phases of construction that these contexts and assemblages are almost always entirely lost.⁶⁹

To give an indication of how distinctly disproportional these classifications of context are, and of the value in distinguishing between them, for the many hundreds of units uncovered and recorded across the entire site, no less than 93 per cent of the volumetric contexts (so, those that could possibly contain artefacts) were deposited as part of the construction and creation of the urban space.⁷⁰ Thus, the reality is that just 7 per cent of contexts that could potentially contain artefacts can be reasonably associated with the use of that phase and, perhaps, space. Distinguishing the contexts in this way allows for a redivision of the coins and their contexts, the result being that, of the 970 coins from sub-AD 79 contexts (having omitted those from modern or highly contaminated contexts), the vast majority (897, or 92 per cent) recovered from our excavations were not found on the floor, or trodden into the floor, but within the floor.⁷¹ These numbers are yet more compelling when the focus is switched to the coins from 'occupation/use' contexts, seventy-three in total (8 per cent). These come from just nineteen separate contexts from our entire excavations. Moreover, although reasonably classified as from 'occupation/use' contexts, almost all of them were recovered from primary waste deposits. Just nine coins (barely 1 per cent of our entire coin assemblage!) were found in association with a secure, primary context: five were sealed under collapsed architecture and within burnt destruction layers, while four were associated with ritual deposits.

A further consequence of distinguishing the contexts and coins in this way is that still no pattern emerges from their find-spots to suggest some kind of correlation between coin loss and find location. For example, while more coins were found in one building than in others (31 from Trench 54000 in I 1, 1), there are no strong distribution patterns of a spatial sort (Figure 10.5); indeed, even if we count the most securely known coins from primary contexts, which at scarcely 1 per cent is a statistical folly in the first instance, none of them maps onto shop fronts (two were from Trench 58000, the others from Trenches 19000, 25000, and 57000). Ultimately, the pattern of coin finds is as useful (or useless) as the AD 79 finds for generating conclusions about the relationship between coin loss and the use of space.

⁶⁹ For a good overview of the 'accretion' and 'depletion' processes of floor deposits, see LaMotta and Schiffer (1999: 20–5).

⁷⁰ This calculation omits contexts like cuts and features and architectures that do not typically contain artefacts; it also omits contexts assigned to modern disturbance.

⁷¹ The 970 coins are made up of 481 from VIII 7 and 489 from I 1. A similar pattern is evident in the coins from the sub-AD 79 excavations of the Casa di Sallustius, where the vast majority of coins is from construction fills. See Ranucci (2014).



Figure 10.5 The distribution of stratified coin finds from 'use' contexts.

The reading of the development of a site, and the interpretation of its artefacts, thus depends entirely on these contextual distinctions. None of this is to privilege one type of context (say, primary) over another (the secondary and tertiary, even quaternary, etc.). While assemblages from primary phases may be of a higher value for considering the chronology of a phase—and, not least, something of the activities occurring at that time—the artefacts from the construction contexts, while typically made up of secondary, tertiary, quaternary material, and so on, are of enormous significance for understanding essential activities such as waste management and the sorting, storage, and ultimate (residual) use of those materials in construction (and many other things besides). Each type of broadly defined context is therefore of great archaeological value, and all the more so when (rightly) set apart from each other. Such an awareness can lead us some way towards eliminating the ‘puzzle’ of why, for example, there should be several coins discovered in the stratified excavations of the atrium of the Casa delle Vestali (VI 1, 7), a space that might otherwise not be associated with monetary transactions and coin loss.⁷² It is hard to imagine, of course, that the coins in the atrium space could have ever been recovered from on top of a mosaic or cement floor, lying untouched during the use of that space and its subsequent replacement by some other floor, but were rather recovered from within the matrix of the construction of those floors and space.⁷³ All of these basic but fundamental misinterpretations are reminiscent of the long-standing ‘Pompeii Premise’, which was founded on the belief that the daily objects recovered from the AD 79 excavations at Pompeii were ‘frozen in time’, and thus their find-spots correlated directly with the spaces in which they were used.⁷⁴ This was, of course, a mythical situation, but one which had emboldened generations of Pompeianisti to make overly positivistic claims as to the use of artefacts and their find-spots for understanding the use of space. To this we can add some kind of ‘stratified assemblage premise’, in which the stratified assemblages of construction fills are mistaken for house-floor assemblages.

The question remains: how did the coins—and everything else, for that matter—get into these construction fills in the first place? And, how does that information affect our understanding of the distribution of coin finds and the use and development of those spaces? The statistic that barely 8 per cent of all stratified coins in our excavations at Pompeii come from primary phases demonstrates the need to modify our overly simplistic model of coin use and loss, and how those activities correlate with the locations in which we

⁷² On the puzzle, see Hobbs (2013: 107). No contextual information is provided for these coins.

⁷³ Similarly, Reece’s ‘Fishbourne effect’ holds that sites with mosaic floors will yield fewer coins than those with muddy surfaces. See Reece (1971: 97–100; 1996: 345).

⁷⁴ On the Pompeii premise, see Binford (1981). For reactions against it, see Schiffer (1985); Allison (1992; 2004); Dicus (2014).

find coins on stratified urban sites. At the most basic level, we should imagine a scenario in which dropped coins did not remain unnoticed more or less where they fell, but were instead mostly swept up into local refuse piles, perhaps within the property for a time, before being incorporated into more civic, or at least organized, refuse deposits elsewhere (say, outside of the city; for example, Figure 10.6).⁷⁵ These larger, more organized (and perhaps even sorted) piles of waste were then mined for construction materials as necessary. This is an archaeologically detectable life cycle for urban waste, a not uncommon phenomenon found among cities of all periods.⁷⁶ The Athenian Agora of the fourth century AD, for example, was ostensibly a refuse site filled with many thousands of low-denomination bronzes,⁷⁷ while some of the best known examples come from medieval urban sites, such as Billingsgate in London, which has a waterfront site constructed from the city's waste and filled with coins.⁷⁸ One of the most relevant examples for the present study is Verulamium, where it appears that the detritus of the marketplace was swept up and routinely dumped in a designated waste depot (an abandoned theatre).⁷⁹ That coins could pepper such piles of rubbish, civic or domestic, was a fact not lost on Roman satirists: at Trimalchio's banquet, for example, we learn that the upwardly mobile could be so hungry for wealth that they would pick 'even the smallest coins out of the rubbish-pile with their teeth'.⁸⁰

Simple though it may seem, what constitutes rubbish—as well as how it was collected, moved, sorted (?), stored, and reused—can be complicated. Were these rubbish-filled construction contexts made up of hyperlocalized waste and debris (say, that which remained in that same property), or imported from elsewhere such as civic dumps? Evidence from our excavations at VIII 7 and I 1 demonstrates that, while both scenarios occurred,⁸¹ for the more significant changes over time—as one phase to another, which could cause the raising of the floor surface for entire rooms by anywhere from 20–100 cm—the volumetric scale of

⁷⁵ Such urban refuse piles have been recorded outside of the city walls of Pompeii. See Maiuri (1930: 230–73; 1942: 174–5; 1943: 279–81); Chiaramonte-Treré (1986); Romanazzi and Volonté (1986); Etani and Sakai (1994; 1998); Etani, Sakai, and Iorio (2003); Peña (2007: 279–82).

For the illustrated example (by Henry Buglass), which focuses on insect-infested grain in military towns, see Smith and Kenward (2012).

⁷⁶ On refuse and waste, there are several excellent contributions in the fundamentally important *Sordes Urbis* volume of Dupré i Raventós and Remolà Vallverdú (2000), especially Liebeschuetz (2000). See also van Minnen (1994: 230–2); Thüry (2001); Ballet, Cordier, and Dieudonné-Glad (2003); Bar-Oz et al. (2007); Peña (2007: esp. 272–318); Johnson (2010); Macphail (2010); Remolà Vallverdú and Acero Pérez (2011); Dicus (2014). My concept of how refuse and waste could be reused as building material has benefited enormously from conversations with Kevin Dicus.

⁷⁷ Thompson (1954: 2); Volk (1996: 389).

⁷⁸ On Billingsgate, see Blackburn (1989: 17). See also Stott (1991). For a similar circumstance at eighth-century AD Dankirk in Jutland, see Bendixen (1974).

⁷⁹ Casey (1986: 81). For the coins themselves, see Reece (1984).

⁸⁰ Petr. *Sat.* 43.

⁸¹ Dicus (2014).

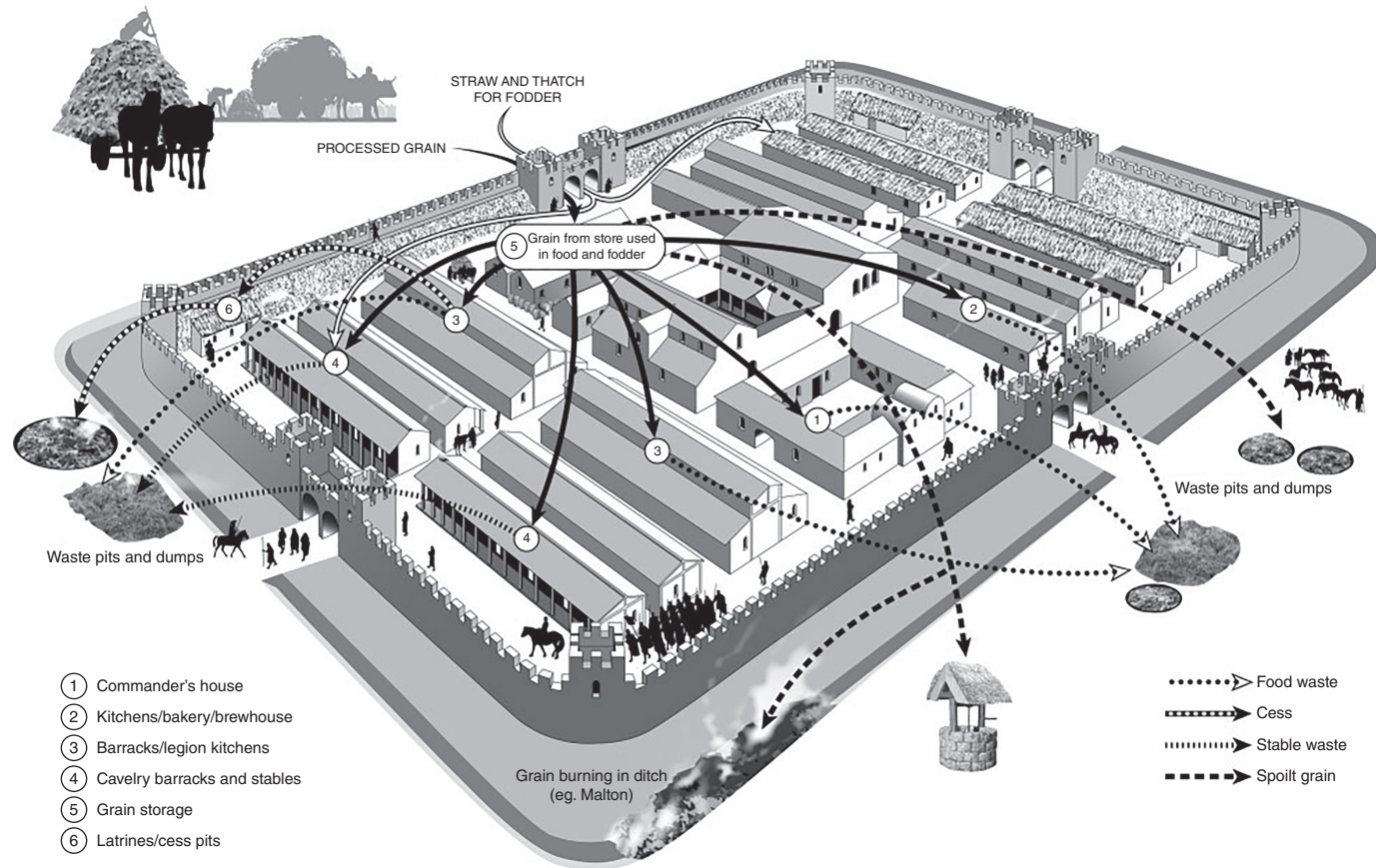


Figure 10.6 A diagrammatic sketch for how urban waste can be sorted and deposited outside of a fort's walls (after Smith and Kenward (2012: 145, fig. 3); illustration by Henry Buglass).

the changes and construction exceeded any kind of reasonable expectation for the amount of material that could be mined from a local waste pit/system: the debris and refuse must have come from elsewhere. This is further demonstrated by the fact that the many construction fills in VIII 7 and I 1 tend to be made up of generally fewer types of artefact than primary contexts, suggestive of the mining of a more organized and sorted waste pile intended to be (re)used as construction fill. The fact that so many of these artefacts, including the coins, show signs of significant wear and, moreover, traces of mortar on their broken edges and surfaces, underscores the likelihood that the coins we are finding are from imported rubbish piles; the mortar, moreover, demonstrates that the coins will have already been incorporated (as waste and debris) in the construction of walls and other architectures that had perhaps collapsed and gone once more to a rubbish pile for further reuse.⁸² This cyclical nature of the coin as a component of reused rubbish shows just how far, and perhaps frequently, the coin could travel, in an archaeological sense, since its loss from the circulation pool.

‘AFTERLIFE’ COINS

Clearly an extra phase is needed in the customary coin loss model, the addition of which could radically change the way we ultimately read the distribution patterns of coin finds. We have surely known to do this, thanks to the lessons Michael Schiffer taught our discipline some forty years ago about the life histories of objects and the difference between an object’s systemic and archaeological contexts; the problem he saw then was that too many assumptions were being made about how the spatial patterning of artefacts can reflect the spatial patterning of past activities.⁸³ Many current numismatic studies, however, even those that (rightly) treat coin finds as artefacts and, moreover, deal with the life histories of coins and the contexts of their find-spots have continued to neglect to recognize the movement (or even to distinguish) between a coin’s systemic context and its archaeological one. To be fair, at least the systemic context of a coin’s life history is well understood in numismatic circles, particularly from minting through circulation.⁸⁴ Richard Hobbs,

⁸² On the reuse of debris from collapsed architecture, see Liebeschuetz (2000).

⁸³ On the transition from systemic to archaeological context, Schiffer (1972). On the sequences in the processes of the life history of an object, see especially the volume dedicated to this topic in the journal *World Archaeology* edited by Gosden and Marshall (1999); see also Schiffer (1972; 1987); Thompson (1979); LaMotta and Schiffer (1999: 19–29; 2001: 21–2); Peña (2007: esp. 6–16).

⁸⁴ Kemmers and Myrberg (2011: 89–90), demonstrate that a coin can have a primary (production), secondary (use), tertiary (deposition or loss), and quaternary (recovery of the coin by excavation or otherwise) context.

for example, has very correctly described coins from archaeological sites as being 'live' or 'dead',⁸⁵ with 'live' coins being those that were part of the coin pool, and would have remained as such were it not for the AD 79 eruption; the best example is the stash of coins found in the bar counter at I 8, 8.⁸⁶ 'Dead' coins are those found in the sub-AD 79 deposits, which, for intentional or unintentional reasons, had fallen out of use. But the coin loss model, or the coin biography, ought not die at this point, but instead benefit from a further classification in the life history of a coin: this could be termed 'afterlife' coinage.⁸⁷ These are the coins that, although falling out of use ('dead' coins) in a monetary sense (its systemic context), continue as an object to move and to be incorporated, almost always unintentionally and without purpose, within a tertiary or quaternary context such as refuse and/or construction debris. While no longer existing in a systemic context, the coin is now part of an archaeological one. In this capacity, the historical and archaeological value of 'afterlife' coins can be measured in more comprehensive and appropriate ways, particularly with regard to site formation processes; after all, if broken pieces of pottery can have archaeological and stratigraphic value when found within building debris, then surely coins—and even the most miserably preserved ones—can as well.⁸⁸

CHRONOLOGICAL PATTERNS IN THE DISTRIBUTION OF COINS AT VIII 7 AND I 1

If the vast majority of Pompeii's stratified coins are 'afterlife' coins, imported with construction fills from rubbish pits located elsewhere and so part of archaeological contexts not systemic ones, how do we explain the pronounced pattern of their being so commonly found in street-side rooms such as shops? And, given that the contexts for these coins are construction fills, why should there be more coins in some fills than others? Here our attention turns to the chronological patterns in the recovery of these coins. The question of when we

⁸⁵ Hobbs (2013: 6, 19–20).

⁸⁶ The 1,385 bronze coins found in an inset vessel in the counter of a bar at I 8, 8 (the so-called Thermopolium of L. Vetutius Placidus) represent the largest stash of coins found at Pompeii. See, especially, Castiello and Oliviero (1997); also Castiglione Morelli del Franco and Vitale (1989: 197); Hobbs (2013: 9, table 1); on the property itself, Guirál Pelegrín et al. (1991–2).

⁸⁷ In similar but not matching ways, Peña (2007: 6–9) has recognized how the customary model of pottery life histories requires additional phases, such as reuse, recycling, and reclamation. Especially relevant is his discussion on recycling, 250–71, as it deals with pottery as a component of a fill.

⁸⁸ As recently and well demonstrated in Peña (2007). On the disparity in the ways in which coins are studied, by comparison to other classes of artefact, see Wynne-Jones and Fleisher (2012: 19).

find most coins, however, has its own uncertainties. In the first instance, it is critical to distinguish between the date of (the minting of) the coin and the date of the context in which it is found. There is an archaeological and numismatic obsession, however, with the former distinction, even though coins usually crumble under the chronological pressure we too often place on them; Susan Rotroff, for example, has argued that archaeologists first and foremost want dates from coins.⁸⁹ She is, of course, not wrong. Coins are arguably one of the most precisely dated artefacts available,⁹⁰ and thus can have an obvious value for providing a date to a context, which then allows that context and associated phase to relate to others across the site and beyond for innumerable good reasons.⁹¹ The reality, however, is that coins are overrated as dating tools, especially those found in the volcanic soils at Pompeii; most are not just heavily worn, but corroded beyond legibility.⁹² Moreover, even though as objects they can have an incomparably secure and close manufacture date assigned to them, for that known date of a coin to be of such a high archaeological value to a context the coin would undoubtedly have to be the latest of all known diagnostics for that context.⁹³ The chances for all of these factors to be in place is of course rather rare, and it is the reason why so often the coin is not actually the latest datable object within its assemblage;⁹⁴ and, indeed, given the fact that so many of our coins are in their 'afterlife' context, the chances of them being the latest dated object is reduced yet more.⁹⁵

⁸⁹ Rotroff (1997: 8–12). See also Walker (1997: 19). For a clear example of the (perhaps overly limited) use of coins to (re)date various contexts, see Mac Isaac (1995); Pıslaru (2009: 128–32).

⁹⁰ The chronological precision assigned to the minting of a coin has long been appreciated. Cf. Thomsen (1836: 81). For some recent and broader discussion, see Kemmers and Myrberg (2011: 88).

⁹¹ For a good and recent discussion of the minting dates of coins found at Pompeii, see Hobbs (2013: 63–99).

⁹² Fulford and Wallace-Hadrill (1998: 143) have rightly stated that coins are rarely useful for dating a context, because they are so often heavily worn and illegible; cf. Ranucci (2014: 242). For our own experience at the Porta Stabia excavations, close to 25% of coins were beyond legibility (Giacomo Pardini, pers. comm. July 2012).

⁹³ Basic but good discussions on the difficulties associated with coin dates and strata are found in Casey (1986: 76–9); Evans (2013: 113–15). See also Collis (1988), and King (2013).

⁹⁴ Rotroff (1997: 15) has shown that, in the majority of the deposits and contexts with which she has dealt at Athens, the coins are typically considerably earlier than the last-dated pottery. Buttrey (1980: 33) has equally demonstrated for Cosa that coins struck in the late third and early second century BC remained in circulation at least until the Augustan period, when they were halved. More recent excavations at Cosa by Lisa Fentress and Adam Rabinowitz have further shown how dated contexts and phases often have much earlier coins in them (see phase IIIa, an Augustan phase, of shop D in the House of Diana that contained a coin of 211–150 BC (US 19): <<https://www.press.umich.edu/special/cosa/home.html>>).

Phase IIIa = <https://www.press.umich.edu/special/cosa/f5_p_iiiia.html>.

Finds list = <https://www.press.umich.edu/special/cosa/dl/context_list.pdf>.

⁹⁵ As Reece (1985: 86–9) has so simply pointed out, having a Republican coin found in a pit that was dug through an Augustan floor means that the coin itself cannot possibly help in the dating of the event, the pit, with which it is now associated.

Thus, the second fundamental uncertainty is associated with the indefinable length of time taken for a coin to become lost, entrapped within a pile of refuse, and subsequently (and potentially repeatedly) incorporated into a construction fill. This range of time must have been wildly variable: from days to centuries.⁹⁶ It is therefore rather more possible, and indeed necessary, to instead attempt to date the archaeological context in which the entrapped coin was incorporated as building debris than to focus on just the date of the coin itself; this is a less circular process than it may seem, given that coins are so infrequently the latest diagnostic object.

Now that it is clear that the distribution of coins is heavily dictated by their presence in imported construction fills, and that the diagnostic assemblages of these contexts are what provide a date to a coin's 'afterlife', the second very striking pattern in the occurrence of stratified coin finds uncovered by the PARP:PS excavations finds that of the 941 coins that can be assigned to a phase within both *insulae* (thus, omitting those recovered from modern or contaminated contexts),⁹⁷ no less than 435 coins (46 per cent of the *entire* sample) appear in just a single phase: that of the Augustan period (Figure 10.7). This statistic is all the more pronounced when we see that not only did the pre- and post-Augustan period constitute several phases (four and two phases respectively), but also, and more importantly, many more decades of monetized activity. To normalize the numbers so as to make them more comparable over time, given that the pre- and post-Augustan phases were of a longer total period, an approximate common denominator of, say, thirty years (a generation or so) can be reflected as one unit and attributed to the Augustan period; this allows the earlier and later phases to be normalized more appropriately against the Augustan period (Figure 10.8).

An explanation is needed for why we find more 'afterlife' coins in the Augustan period than during any other period in the city's development. Developments in the monetization of urban centres at this time are at once a seemingly obvious cause.⁹⁸ At the simplest level, it is hard to argue against the most basic of notions that a 'site with moneyed people is therefore more likely to provide coin losses than a site with poorer people'.⁹⁹ Many

⁹⁶ The residual nature of coins is highlighted by the 'live' coins of the AD 79 phases; see note 86, on the stash of coins found at I 8, 8. Duncan-Jones (2003: 167–71, fig. 4) has shown that, of the silver coins in circulation in AD 79, 66% were minted in the Republican period; alternatively, he has also shown that barely 3.5% of Augustan-period bronze coins remained in circulation by AD 79.

⁹⁷ A total of 452 coins from VIII 7; 489 from I 1.

⁹⁸ On monetization, see Howgego (1992: 16–18); Temin (2001); Lo Cascio (2009); several contributions in Harris (2008a); von Reden (2012).

⁹⁹ Reece (1996: 374). On the impact of monetization on unintentional coin loss, see Evans (2013: 111). Cf. Butcher (2013: 2), who argues against the positivist notion that any spike in the number of coins being lost in a phase should necessarily correlate to greater economic and monetized activity.

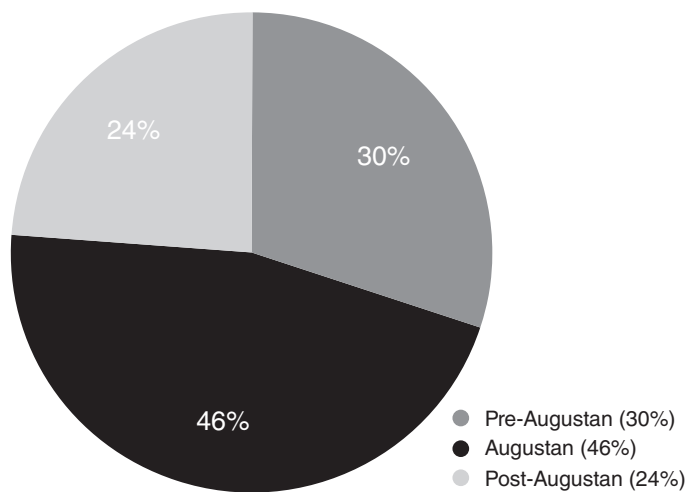


Figure 10.7 The percentage of coins recovered from pre-Augustan, Augustan, and post-Augustan phases.

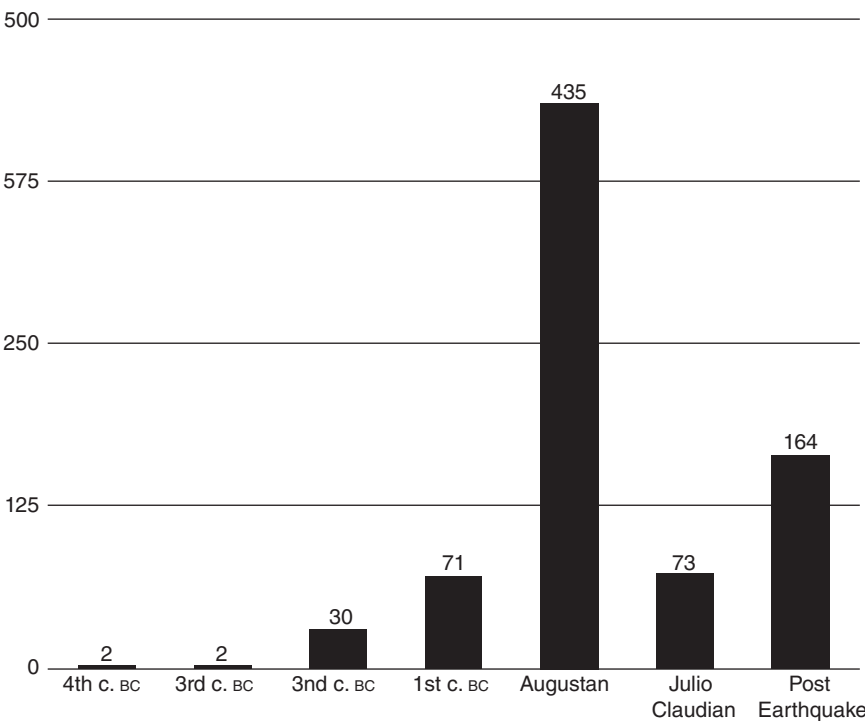


Figure 10.8 The number of coins recovered from stratified, phased contexts, normalized to thirty-year ranges for each period.

have argued that monetization increased from as early as the mid second-century BC,¹⁰⁰ with additional jolts attached to economic booms of varying scale, such as during the Social Wars and the later Republican period.¹⁰¹ Others have argued that increased monetization is better explained not by improved economic conditions, but by increased spending by the government on, mostly, their soldiers.¹⁰² Monetization can also be measured by various proxies, taking hikes in Mediterranean-wide activities such as trade, for example, as measured by increased shipwrecks, and working under the premise that trade could only be facilitated by cashed-up customers and merchants.¹⁰³ And all of this kind of monetization should leave some trace in the archaeological record, given that it impacted all parts of the socio-economy; Dio Chrysostom, for example, reminds us that even the plebs needed coins for everything they bought.¹⁰⁴ On the other hand, proxies for money, such as the use of credit in place of monetary transactions, serve to complicate the picture.¹⁰⁵ In any case, the spike in coins during the Augustan period points only in part, albeit necessarily so, to increased monetization at this time; the coins exist in the first place probably because of Republican monetization, and indeed the prominence of early first-century BC coins speaks to this.¹⁰⁶ It is therefore very tempting to make a direct causal and chronological connection between the spike in coin numbers and increased monetary transactions: simply, the data could point to more shops with more coins and more coin losses. But rather than just their presence alone, in greater or lesser numbers at one time or another, it is again their contexts—which here reflect a spike in coin numbers during their reincorporation within construction fills—that ultimately point towards other factors, albeit potentially and arguably related, such as an increase in building activities at this time. To look at the broader context of *insulae* VIII 7 and I 1 we can indeed recognize some fundamental developments at this time, with many of the street-side production spaces being replaced by more dedicated retail outlets in the Augustan period; outside of the wholesale efforts to rebuild many parts of both *insulae* following the earthquake/s of the early AD 60s, in no other period in time do we see each property of this corner of Pompeii completely redeveloped.¹⁰⁷ These urban developments were on a massive scale with surely

¹⁰⁰ On the steady and strong increase in coin supply from the mid second-century BC, see Hopkins (1980: 109, fig. 2); and Crawford (1985: 177, 185). See also Crawford (1974: 694–707); for a critique, see Buttrey (1993); Cooper (1994).

¹⁰¹ On the increasing demand for money during the later Republic, see Hollander (2008).

¹⁰² Liebeschuetz (2001: 45).

¹⁰³ Hopkins (1980: 106).

¹⁰⁴ Dio Chrysostom, 7.103–7.

¹⁰⁵ On cash, credit, and barter, see Saradi (1995); Harris (2006; 2008b); von Reden (2012: 279–83). That barter could occur during times of high monetization, such as the fourth century AD, is argued as myth in Carrié (2012: 22–3). See also Chapter 13 (this volume).

¹⁰⁶ Pardini (2013).

¹⁰⁷ On the impact of these changes, see especially Ellis (2011d); see also Ellis et al. (2011).

significant implications for the urban landscape throughout (at least) this corner of the city; the abandonment of production activities that had shaped the working livelihoods of these families, for at least 100–150 years, in favour of retail activities must have had significant socio-economic consequences.

Perhaps the clearest indication that these coins represent increased construction activity at this time, rather than the argument that there were more coins because there were more shops, is the fact that the same increased densities of coins in Augustan-period construction fills are not even remotely matched in the following periods of securely known retail activities (Figure 10.8). If the coins are to be associated so directly with coin loss within a shop, then why do we see their numbers dropping between the Augustan period and AD 79, a period when this neighbourhood was almost exclusively retail? The answer must surely come from associating lost coins with the fills of construction activities than by some direct association with the spaces in which they were originally dropped, not retrieved, and lost.

That the abundance of coins under shop fronts relates more to construction activities in the Augustan period than to the loss of coins in those specific spaces is therefore a result that is no less interesting; indeed, it might be more so. As part of an assemblage for construction fills, the context for the coins is in several ways more informative than the (often illegible) coins themselves. We can now assemble, for example, a massive body of evidence for an intensification of monetary exchange leading up to and/or during the Augustan period, as well as a pronounced increase in the construction of more dedicated retail spaces at this time. At a local level, for example, we may be able to relate these construction activities to Augustan-period developments along the street, for it is now that this part of the Via Stabiana was (re)paved, causing the raising of pavements along each side of the street; even if there was no pressing urgency to open up a shop at this time, the raising of pavements might have at least prompted the owners of some of these properties to raise the level of their floor surfaces to ensure drainage systems remained in proper operation.¹⁰⁸ Whatever the motivation, it is at the street front that we see most of the urban changes over time, and so it is here, because of the many construction fills, that we find *most* types of artefacts, not just coins.

The wider consequence of these results is that we can begin to chart a revised and more detailed history on the development of Pompeii's retail history.¹⁰⁹ Traditionally, the shops of Pompeii have been seen as a result of the earthquake of the early AD 60s, whereby the frontages of houses were abruptly given over to retail activity and operated by a new class of people. Most of these discussions deal with the perceived socio-economic 'downgrade'

¹⁰⁸ On city infrastructure and drainage, see Poehler (2012).

¹⁰⁹ Principal discussions, especially on the dating of shops, remain Maiuri (1942) and Gassner (1986).

of a property because of the installation of a shop in it.¹¹⁰ Regardless of the intensity of debates surrounding these positions, none has yet approached the history of Pompeii's retail landscape with stratified excavations into the history of the shops themselves.¹¹¹ And while the earthquake had major consequences in this corner of the city (every building shows major destruction, as well as some burning), no clear change in the organization or use of space is apparent at this time. Certainly there are no new shops. All of the buildings, in fact, seem to be rebuilt, or at least repaired, with the reconstruction of many walls from as low as the ground level and mostly along the same foundations and alignments as had existed prior to the earthquake. Our excavations at VIII 7 and I 1 show that any retail boom should instead be pinned on the Augustan era; and this should make sense, given the increasing economic and urban growth across much of the Mediterranean at this time.¹¹² I have outlined some of the causes and outcomes of this rise in retail activity elsewhere;¹¹³ the point to be made here is that most discussions of the developments of Pompeii's economic landscape, including my own, have typically been based on architectural evidence (although the better ones have been formed from excavation data rather than just architecture alone).¹¹⁴ The artefactual evidence for retail, and especially the coins, has never played a meaningful part in these discussions of Pompeii's retail economy. The ultimate conclusion is that, rather than an unprecedented arrival of shops in the final years of the city's existence, the data from VIII 7 and I 1 point towards an earlier florescence of structured retail activity in the Augustan period. The scale of change across this corner of the city is probably suggestive of broader retail and urban developments across all of Pompeii at this time, and perhaps beyond.¹¹⁵

¹¹⁰ On the idea that the construction of the vast majority of Pompeii's shops occurred in houses as a consequence of the earthquake, the result of which was a downgrading of the status of the house, and, by extension, the overall moral fabric of the city, see note 3.

¹¹¹ Gassner (1986: 17) drew on architectural surveys to argue that only twenty of some six hundred shops could have post-dated the earthquake.

¹¹² The bibliography on the urban developments at this time is enormous, and certainly not limited to Hopkins (1978); Jones (1987); Brunt (1990); Woolf (1997); Fentress (2000); MacMullen (2000); Witcher (2006); Wallace-Hadrill (2008: 275–312); Ellis (2011d); De Ligt (2012: 193–246).

¹¹³ Ellis (2011d).

¹¹⁴ See Peterse (2007; on which see also Ellis [2008a: 454]) and Hobbs (2013: 73 n. 313) for how scholars continue to date architecture, and not least the Casa del Chirurgo, based on some kind of impressionistic 'examination' of wall structures. See also Ellis (2011c: 7–9). Cf. Pesando (2012: 69).

¹¹⁵ Even if too few of the excavated shops beyond those of the Porta Stabia have been published, still there are enough data to suggest that at least a good number of them date to the Augustan period; for example, several at VI 1 (Hobbs [2013: 73]) and the nearby shops attached to the Casa di Sallustius (VI 2, 4; Anne Laidlaw, pers. comm. Jan 2012). For the construction of shops at Herculaneum in the Augustan period, see Monteix (2010: 349–70). It is surely not unrelated that Pirson (1999: 161, 171–3) has recognized a rise in apartment building during the Augustan period also.

Close to thirty years ago, John Casey described the ways in which archaeologists used coin evidence as ‘deplorable’.¹¹⁶ Rather than side with one or the other of the so-called ‘fraternal enemies’,¹¹⁷ I have instead preferred to explore the various factors that have led to archaeologists finding coins where we do. To do so has required some restoration of the long-forgotten archaeological lore that (micro-)context trumps location for interpreting the spatial distribution patterns of coins. Reading coin finds in this way shows that, of the close to one thousand stratified coins from the Porta Stabia excavations, barely 1 per cent of them might be securely associated with the use and loss of the coin in that particular space. Not everything has been answered; as essential as it may be to distinguish an ‘afterlife’ coin from a ‘live’ one, the potential range of time taken for a coin to pass from its systemic context to the archaeological is still unclear, as is the extent to which this information might enrich our understanding of monetization and the circulation pool. Even so, newer and perhaps broader ideas can be explored as to how the ‘afterlife’ of a coin, and many other artefacts besides, was affected by the creation, movement, organization, and (repeated) reuse of urban debris and waste, and, in turn, how the taphonomy of that material defines the volumetric shape of a city through every stage of its (ongoing) construction. An ultimate consequence was thus to have brought otherwise typically dissociated topics—coin finds, urban infrastructure, and the development of urban economies—into a common and complementary dialogue on the true value of coins for charting the history of Pompeii’s retail landscape.

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¹¹⁶ Casey (1986: 68). On the divide between numismatists and archaeologists, see note 26.

¹¹⁷ See Doyen (2011a).

could have been carried out without the generous assistance and support of the Soprintendenza Archeologica di Napoli e Pompei and the Beni Culturali; thanks especially to my friends and colleagues Pier Giovanni Guzzo and Antonio d'Ambrosio of the former administration (not least for their willingness to allow the coins to travel to Rome for essential conservation work), and more recently Teresa Cinquantaquattro, Antonio Varone, Grete Stefani, and Massimo Osanna. This research has been very generously funded by the Semple Fund of the Department of Classics at the University of Cincinnati, where the project is based, with additional and extraordinary support from the Loeb Classical Library Foundation, the National Geographic Society, and, not least, the National Endowment for the Humanities. Most of the research for this chapter, as well the writing itself, was carried out at the American Academy in Rome while I was a Rome Prize Fellow (2012–2013); my immeasurable thanks to everyone at the Academy.

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Bes, Butting Bulls, and Bars

The Life of Coinage at Pompeii

Richard Hobbs

Coins are important to archaeologists as one of the principal categories of ‘small find’ that can offer dates for archaeological contexts. Coin assemblages, as opposed to individual pieces, have the potential to give insights into how economies functioned. Coinage has been an extraordinarily enduring human invention, yet there was a time when coins were not used by ancient societies (and, indeed, there are still some remote social groups which do not and never have used them). And yet the time is not inconceivable—and this day may arrive sooner rather than later—when, somewhere in the world, the last transaction using metal coinage will take place. We are in any case already witnessing a major shift in the ways in which money, in all its forms, is used. In Volos in Greece, for example, a system of barter has been introduced which runs in parallel to the euro—conducted electronically, it allows local people either with a surplus of goods or able to offer a service (for instance, hair-dressing), to receive credits (one credit equivalent to one euro), acceptable by businesses in the local area—once the exchange has been made, the system deducts the appropriate number of credits from the person receiving the goods or services.¹

This return to a system of exchange analogous with ancient forms of credit was a localized response to the Eurozone crisis and the virtual collapse of the Greek economy.² More likely to lead to the death of coinage would be economies becoming so sophisticated that all transactions can take place electronically; it is already possible in many developed countries to

¹ <<http://greece.greekreporter.com/2012/04/14/volos-turns-to-local-currency-as-economy-struggles/>>.

² For a lively discussion of ancient credit systems from an anthropological perspective see Graeber (2012).

conduct material and non-material exchanges without using banknotes or coinage (although coins tend to still be used for small-scale transactions, purchasing a newspaper and so forth).³ If coinage does eventually expire, which seems inevitable, it will bring to an end a system of exchange that has functioned very effectively for the best part of 2,500 years.

Therefore, bearing in mind that coinage may one day be consigned to the history books, Pompeii provides an excellent case study for the adoption of coinage during the earliest period in the history of struck coins. The purpose of this chapter is to attempt to provide a narrative of how coins came to be used in Pompeii, some thoughts on how they were used, and posit some of the unanswered questions which further research may help to elucidate.

‘NON-NUMISMATIC’ EVIDENCE FOR THE USE OF COINS AT POMPEII

The main focus of this chapter is on the assemblage of coins from regio VI 1, material I have been researching on and off for the last fifteen years. The full publication of this assemblage is now available.⁴ Before I turn my attention to these coins, which all derive from below the AD 79 destruction level, I want to briefly examine what we know of coinage in Pompeii at the time of the eruption.

Over the centuries, many thousands of coins have been recovered from the town, and many thousands more must still lie awaiting recovery. One survey gathers together records of around 33,000 coins,⁵ and uses these data to examine the circulation pool at the time of the eruption; other researchers have conducted similar types of analysis.⁶ But we still await a comprehensive corpus of known coin finds from the AD 79 levels, which would be an invaluable resource for understanding Pompeii’s economy in its last manifestation, although the Istituto Italiano di Numismatica is in the process of publishing comprehensive summaries of coins by region: regions I, VI, and X have been published or will be published in due course.⁷ One major obstacle to studying the coinage from the eruption phase is that the level of detailed recording of provenance is generally very poor, that is, it may be known that a certain coin had been recovered from Pompeii, but where *exactly* the coin was recovered is invariably not recorded. This substantially limits what can be achieved with the numismatic data, because context is everything when it

³ Although even this is changing, with the introduction of ‘contactless’ card payments for payments in the UK of less than £30.

⁴ Hobbs (2013a).

⁵ Duncan-Jones (2007).

⁶ E.g. Giove (2003); Vitale (2008).

⁷ Cantilena (2008); Taliercio Mensitieri (2005); Giove (2013).

comes to understanding to what use individual coins were put. As a simple example, a coin found behind a bar counter is most likely to have been dropped during an economic transaction, whilst one found beside an altar in a temple precinct is more likely to have been deliberately deposited, either as a plea for help or an expression of gratitude to the deity in question; a 'spiritual' transaction, in effect.

There are, however, some examples of AD 79 coinage for which a context is known, which offer interesting insights into the currency in use. I term this type of coinage 'live' coinage, as it was the coinage in *active* use when the eruption occurred. One of many examples comes from nearby Oplontis, where a body was discovered with two groups of coins: eighty-one freshly struck gold coins (*aurei*) of Vespasian, who died just a few months before the eruption, and a group of good-quality silver coins (*denarii*), mostly dating to the Roman Republican period.⁸ It is clear that these coins were chosen for rescue as they had a high intrinsic value in relation to their ease of transport; at times of crisis, precious items, in combination with a high degree of portability (e.g. gold and silver coinage, jewellery) tend to be harvested. What is interesting about these coins, however, is the fact that they include both recent mint output *and* coins which had been struck many decades earlier. This offers an intriguing glimpse into the mind of the unfortunate victim, for it demonstrates how old coinage, which ought to have long since fallen out of circulation, was still valued by its owner. Why? The answer is quite straightforward: older Republican silver coins had a high silver content—unlike, for example, the debased legionary *denarii* of Mark Antony—so were worth retaining because they had a high intrinsic value. Our Oplontis victim was probably not the only person to hang on to older silver currency, in the same manner that people today might retain gold sovereigns, antique jewellery, or items of silver plate; objects not able to be exchanged for goods in the local high street, but 'stores of wealth' available for conversion into usable currency if the portentous 'rainy day' ever arrives.

Not all the evidence for this 'live' coinage comes from coinage itself. In the Praedia di Giulia Felice, there is a still life that depicts a mixed pile of gold and silver coins, echoing those found on the Oplontis eruption victim.⁹ Presumably commissioned by the owner rather than chosen on the whim of the painter, this painting offers another interesting insight into the mind of one individual in the last few years of the town's existence. Perhaps the message being conveyed is: 'Look at me, I am rich. Observe the size of my cash reserves.' Or maybe the owner worked in the finance sector, lending money at interest perhaps, and the painting was simply a form of advertising: 'Come to me if you need a loan.'

⁸ Castiglione Morelli (2003).

⁹ Reproduced in Hobbs (2013a: fig. 3).

The other interesting aspect of this painting is the fact that two piles of coin are depicted: one, a mixture of gold and silver, the other a separate pile of bronze coins. This neatly illustrates the distinction that can be made between coins as 'stores of wealth' and indicators of a person or family's power and status, and coins used to facilitate exchange. At all social levels, the ownership of gold and silver was regarded as a measure of success, influence, and social mobility; as we have seen from the Oplontis example, intrinsically valuable coins were often retained, passing through only a few pairs of hands, which must have been the case, given that the victim was not alive when the silver coinage was struck. Bronze, on the other hand, was fiduciary, a token coinage, of little intrinsic value: it was also of low retention, and high velocity, passing through many hands. It was also disposable: if a gold coin was lost, the owner would have done their utmost to find it, but they would not have cared about a low-value copper coin in the same way, nor even necessarily noticed its absence. That is not to say that those fleeing the eruption did not take any bronze coinage with them, but the bias is clearly towards gold and silver coins and precious metal jewellery, 'portable wealth' with a high intrinsic value. This distinction between precious metal coins (not disposable) and bronze (disposable) is borne out by excavation: the vast majority of coins recovered from below the AD 79 destruction level are poor-quality bronze coins.

By the final few decades of the life of Pompeii, we can imagine that the majority of everyday exchanges were made using these bronze (and brass) coins: by this stage, coins had become deeply embedded in the fabric of the town's commercial life: coins and how to use them had become part of the social DNA. These coins are also referred to on a number of examples of graffiti found around the town, which provides us with another 'non-coin' insight into how the economy worked. For example, on the outside of shop VII 2, 44 on the Via degli Augustali, the following graffito was discovered:

Hedone says you can drink here for one *as*, if you give two, you will drink better; if you give four you will drink Falernian.¹⁰

This graffito informs us that different qualities of wine were available depending on how much one was prepared to spend or could afford; according to Pliny the Elder, Falernian was one of the highest-quality local wines.¹¹ Another example was discovered in the atrium of regio IX 7, 24–5, and records food either sold or purchased: for example, 'bread 8', 'wine 1 *denarius*', 'leek 1, for a small plate';¹² in the instances where a denomination is not named, these seem likely to be *asses*, the standard unit of reckoning. In turn, it is possible to link these examples of prices with coins found in situ, that is, abandoned by

¹⁰ CIL 4.1679; translation: Cooley and Cooley (2004: H12).

¹¹ Plin. *N.H.* 14.8.

¹² CIL 4.5380. See Cooley and Cooley (2004: H15).

those escaping the eruption. For instance, 1,485 coins were found in the bar of Lucius Vetutius Placidus (I 8, 8–9) on the Via dell'Abbondanza.¹³ All of the coins are of bronze or brass, and there is an unsurprising chronological bias towards issues of Vespasian, Galba, and Claudius, although a few earlier coins, issued under the Roman Republic and Augustus, are also present.¹⁴ But a straightforward link can be made between these coins (probably the till float, rather than a single day's takings) and the prices found elsewhere in Pompeii; that is, when a price is given in *asses*, reference is being made to imperial *asses*, not those of the Roman Republic (although the presence of the small number of Roman Republican coins suggests that these still had some use within the coinage system). The exchange of coin for wine or food can be easily envisioned.

It is also known that, within the parameters of the Roman denomination system—given that Pompeii became a Roman colony from the 80s BC after it found itself on the losing side in the Social War—it would have been possible to convert these bronze coins (in the early first century AD, 16 *asses* to a silver *denarius*) 'upwards' into intrinsically valuable silver and theoretically gold too, via local *argentarii* (moneychangers). *Argentarii* would have used the exchange rates to their advantage, that is, if you wanted to convert the other way, you would receive fewer bronze coins for your silver due to the levying of a commission. And the financial wheeling and dealing of Pompeii's banker, Caecilius Iucundus, known to us through writing tablets, and the case of the Sulpicii family, whose evidence of their Pozzuoli-based usury activities were discovered about half a kilometre south of the Stabian Gate, are other examples of what we know of financial dealings during the Roman imperial period (see also chapters 12 and 13, this volume).

All these disparate sources—graffiti, writing tablets, coins found abandoned *in situ*—give us glimpses into aspects of the economic life of Pompeii in AD 79 and the few preceding decades, but they are little use for examining how Pompeii became so reliant on coins in the first place. For earlier periods of Pompeii, the written and epigraphic evidence is, to say the least, rather patchy. The only written evidence specifically related to the use of coins at Pompeii dates to the second century BC, and comes from *On Agriculture*, the only complete surviving work of Marcus Porcius Cato Censorius, commonly known simply as Cato:

A mill is bought near Suessa for 400 *sesterces* and fifty pounds of oil... At Pompeii, one is bought complete for 384 *sesterces*; freight 280 *sesterces*. It is better to assemble and adjust it on the ground and this will cost 60 *sesterces*, making a total of 724 *sesterces*.¹⁵

So Cato tells us that, in the second century BC, one was able to venture to Pompeii, hand over a certain sum of money, and come away with a complete mill.

¹³ Castiello and Oliviero (1997).

¹⁴ Castiello and Oliviero (1997).

¹⁵ Cato, *Agr.* 22.3.

The mixture of coinage and a commodity suggested as payment for similar at Suessa is an interesting slant on how goods were purchased; we can only assume that it was possible to make part of the payment in a commodity such as oil at Pompeii as well: this type of exchange was not unique to Suessa. However, the problem with this reference is in understanding what exactly Cato means by 'sesterces'. In contrast to the later periods when we can be certain what coin is meant (normally, as has been seen, the imperial *as*) there are some difficulties understanding exactly what denomination Cato has in mind. The coin being referred to here, the *sestertius*, is obviously not the bronze *sestertius* of the imperial period, nor is it the bronze *sestertius* of the Roman Republican period, but a small Roman Republican *silver* coin worth a quarter of a *denarius*. Crawford suggests that Cato may have been referring to the *diobol*, which 'survived as a unit of reckoning in Campania the second century and was in due course called the *sestertius*'.¹⁶ But this is really a matter of nomenclature. The main point in the context of this discussion is that Cato suggests that a monetary system was in place in Pompeii as early as the second century BC, even if what we know of it from this isolated source is limited to the rather rarefied arena of the purchase of mills.

In addition to this single written source, there are also a handful of Oscan inscriptions from Pompeii that refer to the use of 'money'. For example, an inscription on an altar found at the foot of a ramp up to the *pronaos* of the Temple of Dionysus, outside the city, translates as: 'Mr. Atinius, son of Mr., aedile, from his own money.'¹⁷ It is dated to the last quarter of the third century BC. A later inscription, dated to c.140 BC, part of the pavement at the entrance to the *cella* of the Temple of Apollo, reads: 'O. Campanius, [son of?], quaestor, [by decision] of the assembly, from the money of Apollo, had [the pavement] made.'¹⁸

As can be seen, these inscriptions (two of a number), refer not to any particular denomination of coin but simply the Oscan word for 'money'. Each concerns investment in the construction of buildings, and date between the late third and the late second century BC, that is, before the Sullan siege in 89 BC. They do not tell us about the use of coinage for everyday transactions, nor what types of coin are meant by 'money'—on these topics the Oscan epigraphic evidence is silent.

ARCHAEOLOGICAL EVIDENCE FOR THE USE OF COINAGE AT POMPEII

As has been seen, therefore, the written sources provide some glimpses into the use of 'money' in the second century BC, but provide us with nothing

¹⁶ Crawford (1985: 346).

¹⁷ Crawford (2011: Pompeii 16 [vol. II, 642–3]).

¹⁸ Crawford (2011: Pompeii 23 [vol. II, 653–5]).

very specific. For a fuller picture, we need to turn our attention to the archaeological evidence.

About 1,500 coins have been recovered from excavations in regio VI 1. To date, this is the largest excavated group of stratified coins recovered from pre-AD 79 Pompeii and its environs.¹⁹ The coins were the product of a ten-year excavation programme by the Anglo-American Project in Pompeii (AAPP), led by the universities of Bradford and Oxford. The aim of the project was to examine the history of the *insula* by excavating from the AD 79 level down to the natural ground surface.²⁰

The *insula* is situated beside the Porta Ercolano, one of the key entry and exit points to the ancient town. It can be divided into three zones: the large, double-peristyle Casa delle Vestali, which incorporated a roadside bar, a large inn, and an outside dining area beside the town wall; the Casa del Chirurgo, another high-status domestic house; and a 'commercial' area at the apex of the triangle, which included a roadside shrine, workshops, and bars, and culminated in a public well at the triangle's apex (Figure 11.7). Excavations suggested that the earliest evidence for activity can be dated perhaps as early as the late fourth century BC, when much of the plot was open land and the dwellings probably made of timber; by the time of the eruption, every centimetre of space was being used, and most of the block also had a second floor. The high density of occupation is undoubtedly a consequence of the *insula*'s prime location on one of the town's arterial roads, the Via Consolare.

The exceptionally high level of recovery of coinage in regio VI 1 was a direct corollary of the excavation strategy: every dug context was sieved using a fine mesh. This meant that far fewer coins were accidentally thrown onto the spoil heap than is the case with excavation by hand trowel only.²¹ In addition, each coin was recorded contextually, making it possible to trace variations in the levels of coin loss both chronologically and spatially. After excavation, a professional conservator assessed each coin, and, when possible, removed the surface corrosion; this was an invaluable part of the identification process.²²

The main problem, which dogged not just the coins but other metalwork, was the level of preservation: about one-fifth of the assemblage is too badly corroded to identify. Some coins were so poorly preserved they soon turned into nothing but green powder once exposed to the atmosphere. Recording the

¹⁹ This number is likely to soon be matched or surpassed by the Pompeii Archaeological Research Project: Porta Stabia (PARP:PS) excavations, still in progress at the time of writing, which had produced 960 coins as of 2013. Hobbs (2013a: n.367). See also Chapter 10 (this volume).

²⁰ See also Chapter 8 (this volume).

²¹ Most of the excavation work was undertaken by archaeology students, learning the principles of excavation. In my experience, when archaeological contexts are being dug by hand, only seasoned excavators will spot small pieces of corroded copper.

²² I am indebted to Sas Hemmi for her conservation and cleaning work on the AAPP assemblage.

assemblage also presented some challenges. A certain amount of identification was able to be done in the field, but it is not practical, obviously, to carry around a whole library of numismatic reference works;²³ I therefore began to make a photographic record, but this was only partially successful, because more often than not the coins were still too corroded to decipher. So instead I decided to experiment with making plaster casts.²⁴ This had an unexpected consequence: because plaster casts reproduce the surface relief in three-dimensions, rather than two as with photographs, the 'strike rate' of identification increased considerably; some coins, originally put aside as illegible, turned out to be quite readable once a plaster cast was taken. The other advantage of creating a set of casts is that it forms a reliable duplicate record of the assemblage, and also addresses the long-term problem of preservation, as unfortunately the coins themselves are unlikely to survive the ravages of environmental degradation in the decades to come.²⁵

ORIGINS OF COINS FROM EARLY POMPEII

Where do the coins in the AAPP assemblage originate? There are three key places that are represented at Pompeii: Massalia, Ebusus, and Rome—these are discussed in more detail below. Around 6 per cent of the assemblage comes from other places, near and far. From Italy there are a few Sicilian and Bruttium pieces. From the western Mediterranean, there are coins such as a single piece from Carmo in Spain, and a Gaulish coin of the Celtic tribe the Volcae Arecomici. From the eastern Mediterranean come a few Greek coins, such as a handful from Sicyon, and then further east in Asia Minor, a couple of Ptolemaic coins from Cyprus and Cyrene itself. I have termed these regional and coins 'foreign' imports. The proportion of different coin types in the assemblage is shown in Table 11.1.

It is unlikely that this handful of 'foreign' coins can be directly linked with individual traders returning from far-flung markets with the coins in their purses; they more likely crept into the circulation pool of the Mediterranean and passed through many hands before ending up being accidentally dropped in insula VI 1. In this sense, there is nothing unique about Pompeii; most large excavated assemblages include a few foreign oddities. For instance, the large number of bronze coins excavated at Morgantina in Sicily are mostly of Sicilian

²³ I live in hope that, in the brave new world of e-readers, many useful numismatic texts may one day become available in electronic form.

²⁴ I am grateful to Clive Stannard for suggesting that I make casts, and also for demonstrating the best way to go about this.

²⁵ These casts are kept at the British Museum where they are available to anyone who wishes to consult them. The coins themselves are kept in the central depository at Pompeii.

Table 11.1 Summary of coin types represented in the AAPP assemblage

Source	Number	% of total
Regional imports (Italy, excluding Rome)	36	2.4
'Foreign' imports (excluding Massalia & Ebusus)	46	3.0
Massalia & Campanian Massalia	287	19.0
Ebusus & Campanian Ebusus	386	25.5
Anomalous local types	15	1.0
Roman Republican	162	10.7
Roman Republican (cut fractions)	107	7.1
Roman imperial (Octavian to Vespasian)	149	9.9
Illegible	324	21.4
Total	1,512	100.0

For a full catalogue and discussion see Hobbs (2013a).

origin, but a few come from further afield.²⁶ There is another intriguing possibility: it may be the case that some or all of these coins were deliberately discarded when not recognized, rejected by eagle-eyed bar owners as not being 'legal tender', in a similar manner to the experience that all of us have had of handing over coins and promptly finding them being handed back because they are foreign coins which have been used in good faith; shopkeepers tend to spot 'dodgy' currency because they handle it much more regularly than the consumer.

This small number of 'foreign' coins is, however, dwarfed by coins from two other 'foreign' places: Ebusus and Massalia (Figure 11.1). That disproportionately large numbers of coins from the Balearic island of Ebusus (modern-day Ibiza) have been found at Pompeii was first noted by Stazio in the 1950s,²⁷ but it was not until the classification of the series in the 1970s by Campo, a Catalonian numismatist based in Barcelona, that this unusual phenomenon was fully recognized.²⁸ What is particularly interesting is the fact that, at Pompeii, both imports of coins from Ebusus *and* locally produced imitations are found. These coins make up a large proportion of the monetary stock of Pompeii in the late second and early first centuries BC. The most common types feature a figure of the Egyptian dwarf god Bes on both obverse and reverse, sometimes with different symbols in the field (a cornucopia and caduceus are most common). The Ebusus prototypes were then imitated locally, although we cannot at present be sure exactly where, for no concrete evidence of coinage production has been identified at Pompeii, and these coins are found not just at Pompeii but at other places in the region, for instance Minturnae.²⁹ Initially, these imitations were quite faithful to the Ebusus originals, such that it is often difficult to distinguish between the two; but

²⁶ Buttrey (1989).

²⁷ Stazio (1955).

²⁸ Campo (1976); see also Campo (1993).

²⁹ Stannard and Frey-Kupper (2008: 370).

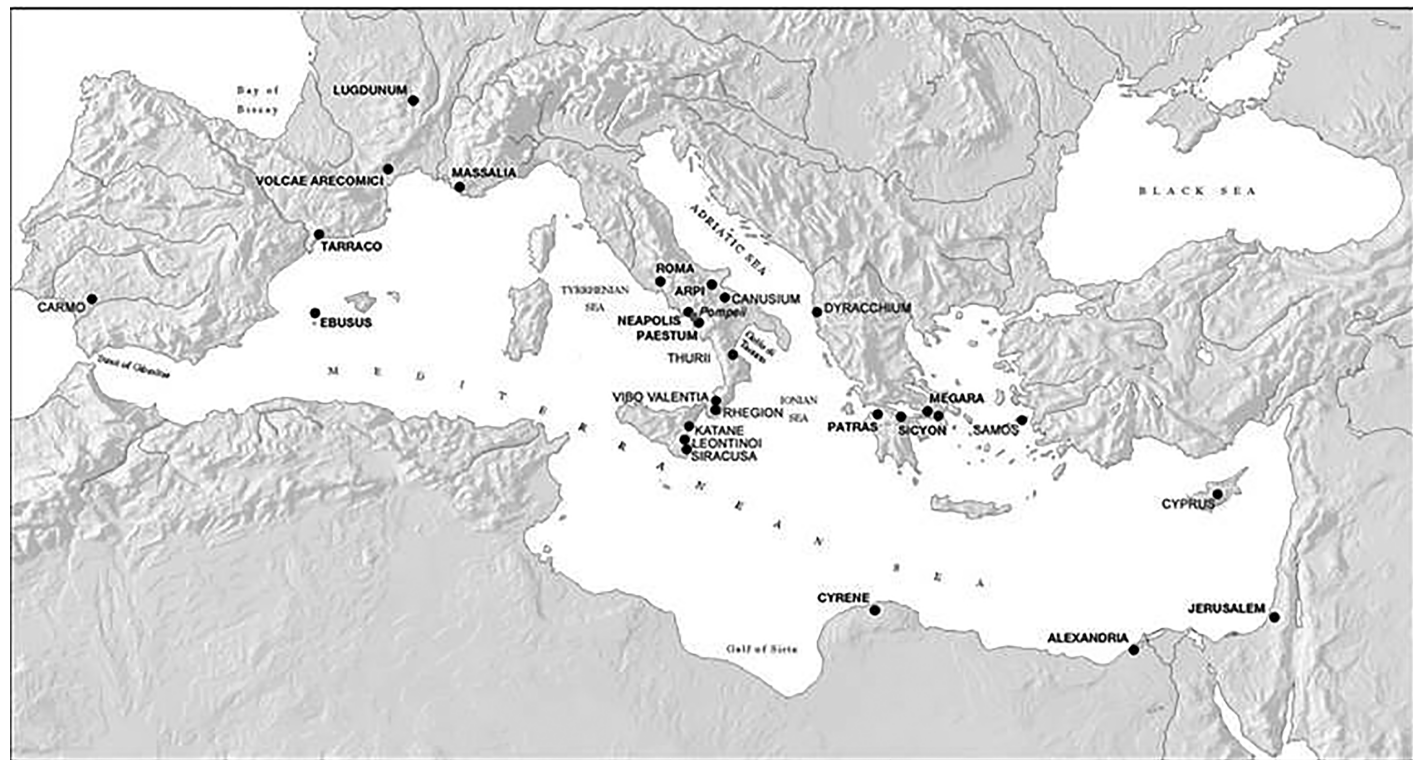


Figure 11.1 Origins of coins in the AAPP assemblage. Map: Richard Hobbs.



Figure 11.2 Bronze coin imported from Ebusus, with figure of Bes on both sides (left); Campanian Ebusus type, with simplified ‘rudimentary’ figure of Bes (right). Photo: AAPP, not to scale.

over time the figure of Bes became very simplified, leading to a ‘rudimentary’ stick figure of the god (Figure 11.2). Also found are a smaller number of types where Bes is combined with a butting bull or the head of a Roman god, normally Apollo, and an even smaller number of examples where he is combined with other motifs, for instance a horse’s head or a toad. Research by Stannard established that these imitations are local to Campania, that is, they have *not* been found on the island of Ebusus itself.³⁰

The second most common coin type found at Pompeii comes from Massalia (modern Marseilles)—in this period, one of the most important port towns on the southern French coast. Vast numbers of the bronze coins struck at Massalia circulated around the coast of southern France, and they also seem to have made their way to Pompeii in substantial numbers. These also broadly date to the late second to early first centuries BC. They normally have a head of Apollo on the obverse, and a butting bull on the reverse, with the mint name in Greek above and below the bull (although normally only the inscription above the bull—*ΜΑΣΣΑ*—is discernible). But there are, once again, large numbers of Campanian Massalia imitations, which sometimes imitate the mint name correctly (and are thus difficult to distinguish from the prototypes) but in many other cases garble the legend, producing variants such as ‘AOM’ and ‘AMOΣ’; in one case, the sigmas are even reversed (Figure 11.3). The high incidence of these coins in Pompeii and other sites in Campania indicate that, in a similar manner to the Campanian Ebusus coins, these coins were also struck in the Campanian region, perhaps Pompeii itself.

In addition to the Ebusus and Massalia imitations, there are a small number of local ‘anomalous’ types that appear, on current evidence, to be unique to Pompeii (Figure 11.4). The most distinctive of these have a bridled horse’s head on one side and bulls or busts on the other. Crucially, these sometimes share dies with the Campanian Ebusus types (although not, as yet, with the types which imitate Massalia). This demonstrates that they must have been

³⁰ Stannard (2005). I refer to these local types as ‘Campanian Ebusus’, Stannard as ‘pseudo Ebusus’ coins.



Figure 11.3 Bronze coin imported from Massalia, with head of Apollo on one side and butting bull with mint name on the reverse (left); local Campanian imitation of the type, with garbled legend above the bull (right). Photo: AAPP, not to scale.



Figure 11.4 Local Campanian types, only found at Pompeii; butting bull and horse head (left); head of ?Mars, turtle (right). Photo: AAPP, not to scale.

struck together. There are also a small number of coins with devices highly unusual for coins in general: a toad on one, and a turtle on another.

It is not the purpose of this chapter to discuss the complexities of these different coinage series; for this I refer the reader to the papers of Stannard and Stannard and Frey-Kupper, and the full publication of the AAPP coins.³¹ But it is important to note that many of these coins are interlinked, that is, stylistically they have many areas of commonality, and in some cases specific dies were shared between different types. This is another reason why it is clear that somewhere in the Pompeii region a local currency was being struck—wherever lots of die-links are found, it is safe to say that the coins have not travelled a great distance from their place of manufacture.

There are, however, many frustrations with making sense of these coins. First, none bears a useful inscription, which at this date usually take the form of a mint name (as an example, nearby Neapolis is a recognized mint because the town's name appears on its coins). Obviously if any of these coins bore the name 'Pompeii', then it would be clear that they had been struck in the town, but sadly this is not the case. Secondly, it is sometimes extremely difficult to distinguish between imports and local copies; the Massalia coins in particular are devilish to deal with, Ebusus coins not much better, aside from the ones

³¹ Frey-Kupper and Stannard (2010); Stannard and Frey-Kupper (2008); Hobbs (2013a).

easily recognized by their rudimentary stick figure of Bes. Recently completed doctoral research may help to address this problem by looking at alloys: imports and locally struck coins are likely to have different metallurgical compositions, which, in combination with the stylistic differences, should help better to understand the typology of the series.³² The third problem is a lack of any discernible weight standard: the latest Ebusus types average just shy of 2 g; the Massalia types usually around 1.5 g. So although they appear to have circulated at around the same time, it is not clear if they could be ‘exchanged’ for each other. They cannot really be linked metrologically with Republican *quadrantes* either (which may have indicated, as we have a good understanding of the Roman system, what face value they might have held), not only because relatively few of these have been found anyway at Pompeii, but largely because although these were theoretically struck at four to the *as* (i.e. about 4 g each), they themselves fluctuate enormously in weight. The fourth problem is a lack of publication: although we know that many of these Ebusus/Campanian Ebusus, Massalia/Campanian Massalia coins have been found at Pompeii, we do not know much of what has been found elsewhere in the region. As an example, I have been reliably informed that there are a large numbers of Ebusus coins in the museum at the Capua,³³ but the museum is currently being refurbished and is not currently accessible, so I have been unable to check if these are imports, or local imitations, or a mixture of the two. Likewise, even when Ebusus and Massalia coins are published, the information is not usually specific enough to allow a distinction to be made between imports and local imitations—crucial to understanding the balance of imported and locally struck coins in the Campanian region.³⁴ So there is much potential in this field for future fruitful research.

The third principal place of origin after Ebusus and Massalia is Rome (Figure 11.5). Large numbers of Roman Republican coins made their way to the town, most of which were struck between the late third century BC to the period of the Social War (c.89 BC). About half of these are *asses*, which is somewhat surprising given that physically these are the largest coins and therefore more easily spotted if accidentally dropped; the implication is that huge numbers of *asses* were in circulation—as explained, the use of sieving means that this is unlikely to be a bias of recovery. All tend to be extremely worn, which demonstrates that their stay in the circulation pool was lengthy.

There are also large numbers of deliberately halved Republican coins. Again, these present us with problems of interpretation. It is not known if

³² Pardini, University of Salerno. Analysis results are promising (Pardini, undated pers. comm.).

³³ Crawford (undated pers. comm.).

³⁴ A point also made by Stannard and Frey-Kupper (2008: 370): ‘The relative number of canonical to imitation coins is difficult to establish because of small samples and because very few specimens have been illustrated in publications.’

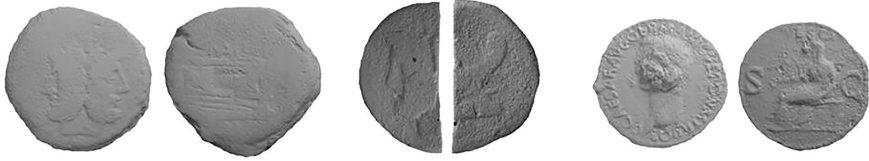


Figure 11.5 Roman coins from the AAPP excavations. A Roman Republican *as* (RRC 203/2, 153BC—far left), a deliberately halved Republican *as* (centre), and an *as* of Gaius (RIC 1, 38, AD37–8, far right). Photo: AAPP, not to scale.

these halved Republican coins (mainly *asses*) were created in Pompeii or imported from elsewhere in their halved state, or if it was a mixture of both. Other Italian sites have produced such fractions, including Cosa, Minturnae, and Morgantina, and they have been found across the ancient world, not just on urban sites, but also at religious sites such as Bourbonne les Bains, and military sites on the Rhine frontier.³⁵ Where these coins may fit into the overall chronology is discussed in the next section.

Unlike the Ebusus and Massalia coins, there appears to have been no systematic copying of the coins of Rome, although the anomalous local type with the bridled horse head appears to have been based on a Roman prototype.³⁶ There are also some coins of the imperial period in the assemblage which are probably imitations, although once again it is not known if these are local imitations or imports from elsewhere.³⁷

CHRONOLOGY

So it is known that, during the second to first centuries BC, the bronze coinage of Pompeii—that is, the ‘small change’ in use by the town’s inhabitants—consisted of coins struck in Rome, Massalia, and Ebusus (with local imitations) and a few ‘foreign’ oddities. But what is less clear is when these different local types were struck and how long they remained in circulation. Previous work based on stylistic developments and dating evidence at the points of origin has suggested that the first groups of Ebusus and Massalia coins began to appear in Pompeii in the mid- to late second century BC. The imitation of these coins is thought to date to the last quarter of the second century BC to the early first century BC. These issues of chronology can be approached in a number of different ways—two are discussed here.³⁸

³⁵ See, for example, Peter (2001).

³⁶ Stannard (2005: 135 n.50).

³⁷ See, for example, Hobbs (2013a: cats. 1078, 1085, 1091).

³⁸ See Hobbs (2013a: 63–99).

Contextual Association

The AAPP assemblage enabled me to examine these local types in contextual association with dated coins, to give an indication of when these coins were introduced into the circulation pool and when they fell out of use (Table 11.2).³⁹ It can be seen that almost half of the Massalia coins (columns 2 to 3) are in contexts which fall into the 150–101 BC dating bracket, which implies that this is the principal period in which these coins were circulation. In later dating phases, the Massalia coins are more evenly spread; and it will be seen that a small number of coins are present in contexts dated to the very final years before the eruption (AD 51–79).⁴⁰ However, the presence of Massalia coins in this final dating bracket is misleading, as all the coins came from one single context, which is in turn dated on the basis of a single coin of Claudius. This both demonstrates the importance of close examination of contextual information, and that, in actuality, it seems that the Massalia coins had largely fallen out of use by the first decades of the first century AD. The main types of Ebusus and Campanian Ebusus coins (columns 4 to 7) (those with a figure of Bes on both sides),⁴¹ similarly mostly fall into the 150–101 BC dating bracket, and once again a small number are found in contexts dated to later decades. Again, like Massalia, it is a small number of archaeological contexts which account for all thirteen of the coins in the decades preceding the eruption, so once more it would appear that these coins had fallen out of use by the time the imperial period in Pompeii's history had begun.

For comparative purposes, the table also shows Republican cut fractions in association with dated coins (columns 8 to 9). It will be immediately obvious that most of these (around 60 per cent) fall into the period 50 BC to AD 50. This is a rather interesting pattern, and it might be suggested that, as this is the period when Massalia and Ebusus coins appear to be falling out of use, it may be the case that these deliberately cut Republican bronze coins were introduced in order to fill a gap in the supply of 'small change'. Is it a coincidence that this is the period during which the Roman colony, imposed on Pompeii as a punishment for being on the losing side in the Social War, was leading to a change in the make-up of Pompeian society? Could we even go so far as to suggest that the rather strange local coins imitating prototypes from Ebusus and Massalia were actively *rejected* in favour of the more familiar form of the Roman coin? These are precisely the types of interesting numismatic and

³⁹ The method of 'contextual association' is described fully in Hobbs (2013a: 90).

⁴⁰ The small number of Massalia—and indeed Ebusus—coins found in association with coins dating from the period before 150 BC should not be taken to imply that they were in circulation earlier than 150 BC, simply that there were some coins of early second-century BC date in contexts which will be residual.

⁴¹ For a discussion of the data of all the Ebusus types, see Hobbs (2013a: 89–92).

Table 11.2 Contextual association of coins from the Massalia and Ebusus-type coins and Republican-cut fractions

Date range	Massalia type 2		Ebusus type 1 and 2		Ebusus type 3		Repub. cut fractions	
	no.	%	no.	%	no.	%	no.	%
Pre-200 BC	4	3.7	4	3.9	1	2.3	3	5.9
200 BC–151 BC	7	6.4	3	2.9	1	2.3	0	0.0
150 BC–101 BC	54	49.5	53	52.0	25	56.8	9	17.6
100 BC–51 BC	6	5.5	5	4.9	3	6.8	6	11.8
50 BC–1 BC	11	10.1	8	7.8	5	11.4	15	29.4
ad 1–AD 50	12	11.0	19	18.6	6	13.6	15	29.4
ad 51–AD 79	15	13.8	10	9.8	3	6.8	3	5.9
Total	109	100.0	102	100.0	44	100.0	51	100.0

economic questions on which large assemblages like that found by the AAPP may begin to shed light.

Coinage and the Sullan Siege

The location of the *insula* is archaeologically serendipitous, even if not so for the occupants in 89 BC, when the town was besieged by the Roman general Sulla. Positioned as it was next to the town wall, it bore the brunt of the large quantity of artillery, including stone balls, ballista bolts, and slingshot, fired into the town until it fell to Sulla's men. The section of wall immediately beside the Porta Ercolano, directly in line with the *insula*, is pockmarked with holes from attack with large stones (Figure 11.6). In addition, a number of slingshot were found at some depth within the archaeology, and this, in combination with other evidence of destruction, made it possible—and, as archaeologists will tell you, this is quite unusual— to identify a Sullan 'destruction' horizon within the northern part of the *insula*, which can be precisely dated to 89 BC.

Having a clearly dated archaeological horizon is extremely fortunate for small finds specialists struggling to establish firm dates for the production of their material, and for numismatic material for which there is no underpinning historical evidence (dated rulers and so on) this type of evidence is rare indeed. Thus it has been possible, by examining those archaeological contexts that are known to pre-date the Sullan siege, to establish with certainty which particular local issues had been struck *before* 89 BC. This does not provide issues with a definitive date of manufacture, but it does at least show which particular coin types were around when. As an example of this, the 'rudimentary' Bes types (see Figure 11.2), with the distinctive 'stick-man' figure, were previously thought to have been struck sometime between the end of the



Figure 11.6 A stone ball excavated in regio VI, insula 1, which fits precisely into one of the holes in the town wall caused by Sulla's siege in 89 BC. Photo: AAPP.

second century BC to the early first century BC; because a small number have been found in pre-Sullan contexts, it is now certain that they were struck before the siege, when, previously, the possibility remained that they might be post-Sullan types. The value of good contextual recording, which in the field requires a degree of effort and attention to detail, is thus amply reinforced. It also shows how, although normally coins are used by archaeologists to date contexts, sometimes the archaeological material and the stratigraphy can rather be used to date to the coins.

WHY BES AND BUTTING BULLS?

Why were Ebusus and Massalia so important to the coinage of Pompeii? There is not an obvious explanation. Was it a consequent of some kind of 'special relationship' between Pompeii, Massalia, and Ebusus? But why these places in particular?

It has been suggested that entire batches of coins were obtained in bulk from the mints of Ebusus and Massalia and introduced as 'small change' into Pompeii's economy.⁴² This is clearly an intriguing notion—we do not normally think of coins being objects of trade, able to be obtained in bulk from a mint for use within a different local economic system to that for which they were originally struck. It is known that whole blocks of coins were sent to the provinces during the Roman imperial period: a good example are the

⁴² '... was there a single block of circulating coin from Ebusus, in some as yet unknown way, in the late second or early first BC?': Stannard and Frey-Kupper (2008: 373).

'Britannia' asses of Antoninus Pius, found in such large numbers at Bath and Coventina's Well, and so heavily die-linked that they must have arrived in this manner.⁴³ It has also been suggested that the vast numbers of late Roman bronze coins found in Sri Lanka arrived as 'objects of trade'—these too were copied locally.⁴⁴ So the notion is by no means far-fetched. The implications, however, are intriguing; it suggests that the civic administration had made a conscious decision to introduce a fiduciary coinage. As Crawford reminds us (my italics), 'It is perhaps worth repeating that coinage is struck at Rome, *as in other ancient states*, to serve the needs of the state, not to supply the consumer.'⁴⁵ Or, in other words, having their own coinage allowed the authorities to control the economic system far more effectively than credit systems and payments in kind; through the system of *argentarii* it was possible for precious metals to circulate, if they could be changed into fiduciary coins, and the town authorities could ensure that the exchange rates always worked in their favour.

So the theory proposed is that, not possessing the knowledge, skill, and raw materials to produce their own coins, the Pompeiian town authorities decided to acquire blocks of coins from Massalia and Ebusus, presumably by making payments to the mint authorities at Massalia and Ebusus in bullion or bulk goods, or perhaps a combination of both. Having 'released' these coins into circulation, they rapidly kick-started a process of local copying, maybe because it would have become obvious very quickly that producing coins in close proximity to the intended market made more sense, and the demand for 'small change' rapidly outstripped supply. But this is when it becomes unwise to get too carried away with the idea, because it is still unclear if Pompeii *was* striking its own coins—all that is known is that these coins are very common at Pompeii. A full survey of how widespread they are in central Italy is much needed, for as the balance between imports and local imitation is poorly understood, we cannot begin to address the question of where these coins were obtained and where exactly they were subsequently imitated.

An alternative explanation is that these coins *are* a factor of a particularly intense mercantile relationship between Pompeii (and perhaps other towns in central Italy, bearing in mind the reservations expressed) and Massalia and Ebusus in the late second to first centuries BC. The idea is that *more* trade can be directly equated with *more coins* from these places, bought back by traders, who introduced them into Pompeii's circulation pool, thus skewing the archaeological record in their favour. At least for Massalia, it is certainly not particularly difficult to find indications of high-level import of both Italic wine and Campanian ceramic wares into Gaul, often using Massalia as the point of entry; this also, intriguingly, seems to coincide with the period when the amount of local coinage at Pompeii appears greatly to increase. For instance,

⁴³ Reece (2002: 39–41).

⁴⁴ Burnett (1998: 185 and 187).

⁴⁵ Crawford (1974: xiii).

at Rue du Souvenir, Lyon, 14,000 amphora fragments (mostly Dressel 1), representing at least 761 vessels, were found dating to the late second century BC—this is the amphora type that would have carried Campanian wine. At Massalia itself, although small numbers of imported pottery types such as Megarian cups are known, assemblages of the late second century BC are dominated by Campanian wares.

Another way to assess the scale of the trade comes from shipwrecks, which not only provide evidence of the bulk trading of goods but also provide hints that the merchants on board were carrying mixed bags of small change, which in turn may give an insight into their movements. The Isla Pedrosa wreck, Spain, was carrying hundreds of black slip vessels, Campanian A ware of the mid-second century BC, as well as lava millstones,⁴⁶ of great interest with respect to the topic of this chapter is the fact that a group of bronze coins was also recovered, which surely belonged to a merchant aboard ship. The group included six Massalia coins, a Roman coin, and a coin struck at Neapolis. Another example is the wreck excavated off the coast at Cavalière, France, which included about twenty-five Dressel 1 *amphorae*, some Campanian black slip ware, and pottery of Spanish origin: 'twelve coins were [also] found, all bronze or lead; the three in the mast-step were illegible, but the other nine comprised five of Massalia, five of Numidia... and one of Carteia in southern Spain'.⁴⁷ Two small coin groups, granted, but these are two concrete examples of merchants carrying Massalia coins, which could theoretically provide us with our Pompeii link. Except that the problem with shipwrecks is that, although we may be able to establish the origins of their cargoes, we are unlikely to know where they were headed, or what they were intending to pick up in exchange; so we cannot go on to conclude that, if the merchants in question had not drowned when their ships sank, they would have spent nights in Pompeii and used the Massalia coins in the purses in the local taverns. Again, more research, which aims to quantify the trading links between Pompeii and other sites in the Bay of Naples, Massalia, and the Balearic Islands, should improve our understanding of the volume of trade between these places.

So the facts are these. It has been established that coins arrived from Ebusus and Massalia into Pompeii, and almost certainly other towns in the Campanian region. These were copied locally, perhaps in Pompeii itself; at present, it is best to say that they were copied somewhere in the Campanian region. Yet why choose to copy these particular coin types? Bes was a minor deity in ancient Egypt, represented as a pot-bellied dwarf with protruding tongue, bowlegs, a bushy tail (sometimes a snake), and a crown of feathers or lotus flowers. Images of Bes have been found in different locations around

⁴⁶ Parker (1992: 217–18 n.520).

⁴⁷ Parker (1992: 133–4 n.282).

Pompeii: most well known perhaps is a painting of Bes found in the *sacrarium* of the Temple of Isis.⁴⁸ Bes was ‘primarily a helpful deity concerned with the protection of the household’, whose ‘tutelary functions involve at least five spheres of human life: the protection of women and childbirth, of sleep, of warfare, of the dead, and the celebration of music, dancing and wine’.⁴⁹ So was it the deity’s association with wine and merrymaking that was the overriding factor in choosing him as an appropriate motif for coin? With the bias of coins towards bars, as seen from the spatial distribution (see next section), is the heavy concentration of coins bearing his image not entirely a matter of coincidence? Or was the adoption of the Bes imagery something specifically related to the Isis cult itself: was the cult in some way responsible for the striking of coin?⁵⁰ If so, why? Again, however, we run into difficulties. Unfortunately, the painting dates to a much later period, from a time when coins with the image of Bes had long since fallen out of use. So once again, more research is needed into the importance of Bes in Pompeii in the late second century BC, the period at which we know that coins bearing his image were in circulation.⁵¹

DISTRIBUTION AND ECONOMIC ACTIVITY

The spatial position from which a particular coin is recovered provides a link with the social and economic activities to which the coin relates.⁵² Thus, when coins are being used for financial transactions, in the vast majority of cases no traces are left in the archaeological record. But in some instances, coins will be accidentally dropped, which may or may not be noticed by either the customer or the vendor of the good or service. There is also not always an incentive, if the loser of the coin notices what has happened, to bend down and pick the coin up; in a crowded bar, it might have not been seen as a particularly attractive proposition to go scrabbling around among other people’s feet. I myself—and I am surely not alone in this—have occasionally dropped small denomination coins, 1 pence or 2 pence pieces, and even though I am aware this has happened, do not think it worth the energy to bend down and pick up the coin.

⁴⁸ D’Alessio (2009).

⁴⁹ Dasen (1993: 67).

⁵⁰ The symbolism of butting bulls is not quite so clear, but, intriguingly, a painting of a bull (admittedly standing, but nevertheless the same beast) was also found in the *sacrarium* of the Temple of Isis.

⁵¹ I have also discussed elsewhere the links between the images of toads and turtles found on a few anomalous local coins and their possible link with Sabazius: Hobbs (2013b).

⁵² See on this topic also Chapter 10 (this volume).

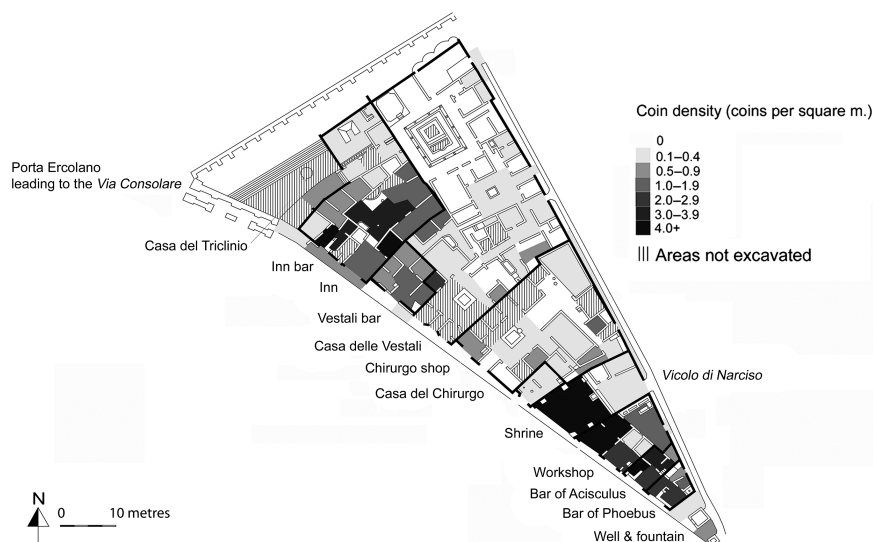


Figure 11.7 Density of coins found during excavations in Regio VI, Insula 1.

Therefore, there is a link between the discovery of coins and the economic, social, and cultural activities that led to their loss. Thus, the large number of coins recovered from regio VI 1 provide an interesting opportunity to test the link between the perceived use of space and the loss of coins.

The lowest densities of coins come from domestic properties (Figure 11.7). The Casa del Chirurgo, for instance, produced only 59 coins (less than 4 per cent of the assemblage), and the Casa delle Vestali does not fare much better (171 coins, c.11 per cent). This must be related to the fact that, in domestic spaces, coins were not generally changing hands on a regular basis, so were far less likely to be accidentally dropped. Taking the bars and inn collectively, these properties account for almost half the total number of coins recovered from regio VI 1, confirming that this is where the most coins were being physically passed from one hand to another and that, over a large number of years, inevitably a few coins were dropped, then trodden into the floor, and ended up as part of the archaeological record.

My curiosity, however, was piqued when I discovered that high levels of coin loss were not just restricted to the bars and the inn; the shrine too produced a substantial proportion of the total assemblage (340 coins, or 22.5 per cent). My immediate reaction was that this implied a different use of coin from most of the rest of the block, coins being accidentally lost during straightforward economic transactions. Religious sites often produce coins in large numbers; indeed, at Pompeii itself, one of the earliest deposits was recovered from the Temple of Jupiter,⁵³ and the votive well at nearby

⁵³ Maiuri (1942: 308).

Gragnano, normally known as the 'Privati deposit', produced more than six hundred coins.⁵⁴ So I made a logical link between large numbers of coins and the presentation of these as offerings at the shrine. It seemed to make even more sense given the location of the block; one could envisage the casting of small coins to the gods when someone was leaving the town in a desire for safe passage in their onward journey, or vice versa on arrival, a small offering in the hope of protection in whatever business the dedicator intended to conduct. But it quickly became clear that, in fact, my assumption was entirely incorrect. Because archaeological investigation of the shrine demonstrated that this area of the *insula* only began to be used as a shrine, possibly dedicated the Lares Augustali,⁵⁵ during the final few years of Pompeii's life. The plot was re-developed as a shrine perhaps as a consequence of the earthquake/series of seismic events which occurred in and around AD 62, which led to widespread remodelling of space in many parts of the town. In fact, it transpired that the area termed 'the shrine' was anything but religious in nature throughout much of Pompeii's history. The activities taking place prior to this were—and this provided a better explanation for the high coin density—largely commercial in nature. Evidence of metalworking, possibly the processing of fish, and, most importantly, the fact that the space had been remodelled to create a number of small workshops, implied that goods were being manufactured here, and—the coins lost in abnormally large numbers—that these were being sold direct to the consumer. So, more likely explanation is that this high level of coin loss can be linked simply to a healthy volume of trade. A more prosaic explanation, therefore, although one way in which the shrine differs from the other areas of the *insula* where there is also a high level of coin loss is that there is no evidence for bar counters—and this may hint at the direct purchase of goods, perhaps items of metalwork, or fish products, which were being sold out of shop units. If this is the case, then this is the very definition of 'small change' in action, at a period during which archaeology, combined with numismatic research, is the primary means by which the economy of Pompeii can be understood.

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⁵⁴ Miniero et al. (1997).

⁵⁵ Jones and Robinson (2007: 400).

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Currency and Credit in the Bay of Naples in the First Century AD

Koenraad Verboven

Money emerged independently in different cultures in various forms and functions—as accounting tools, exchange media, and value denominators. Yet despite its universal characteristics, money has never been a lifeless tool in abstract market systems. The value ascribed to money and the actions associated with it are cultural constructs, socially learned through symbolic communication (language, rituals, pictures) and invested with symbolic dimensions. To understand the Roman monetary economy, we should stop asking ‘what money was’ or ‘what money did’ but focus instead on how social agents acted when they used money, how their action was socially prescribed, and in what social settings it occurred. We need to analyse money not as an instrument, but as a social institution.¹

Roman society was deeply and widely monetized. The widespread use of low-value fiduciary bronze coins shows how even the smallest needs and wants were commonly satisfied through monetized transactions. The use of money was considered a mark of civilization, barter as typical of barbaric tribes.² Economic markets provide the archetypical example of strongly monetized settings in the Roman world, but many other structures, institutions, and organizations also relied on monetized relations. Most taxes were due in money. The Roman army was profoundly monetized. Access to positions of power required property qualifications expressed in money. Imperial bureaucrats received salaries in money. And so forth.

Simply plotting the quantity and spatio-temporal distribution of coin finds, however, is not the best approach to improving our understanding of the Roman monetary economy. We need ways to factor in the social nature of money. ‘Deep monetization’ is a social phenomenon reflecting the central

¹ On money as a social institution see Ingham (1996; 1998; 2000).

² Tacitus, *Ger.* 5, 3–5; Strabo 3, 3, 7; 7, 5, 5. See also Howgego (1992: 19–20).

importance of monetized transactions in social relations and the self-evidence with which social actors think of transactions and valuations in monetary terms.³ The 'breadth' of monetization, as well, is primarily a social phenomenon, reflecting the variety of social contexts in which monetized valuations and transactions routinely take place. Aarts' study of coin use among the Batavi, for instance, showed that Batavian men were accustomed, as Roman auxiliaries, to the monetized environment of army camps and settlements, where they routinely used small bronze. Yet in their indigenous settlements coins long remained a marginal phenomenon, used primarily for sacrificial purposes.⁴ It was not that the social world of these auxiliaries was schizophrenic or that barriers separated the world of the camps from the world at home. Rather, they moved from deeply monetized social contexts to contexts where monetization was shallow. Monetization in Batavian society ran deep, but, until the Flavians, not wide. The situation in Roman Egypt on the other hand was totally different. Here both towns and their rural hinterland were deeply monetized, but monetized transactions in the hinterland were mostly conducted through internal accounts and debt rationing rather than by means of coins.⁵

As far as transactions are concerned, I have argued elsewhere that the Roman monetary system was based on three 'monetary modes' through which monetized transactions could be accomplished: the currency mode, the commodity mode, and the account mode, based respectively on coinage, payments in kind, and transfer of debt claims.⁶ Each comprised various sets of instruments (monetary, financial, and other) and procedures to handle transactions and to change from one mode to another. In this chapter I want to focus on the Bay of Naples in the first century AD: one of the most urbanized and wealthiest parts in the empire. It should be stressed from the outset that this is a very untypical region. Its flourishing went back to the time when Puteoli became Rome's major sea port. Trade contacts with the Aegean are evident from the links between Campanian families and Roman businessmen on Delos. But the Campanian economy was also closely connected with Rome and the imperial elite. Cicero's correspondence shows a number of high-ranking businessmen who helped the senatorial aristocracy to invest and manage their fortunes: Cluvius and C. Vestorius from Puteoli, C. Rabirius Postumus and his father, C. Curtius, and numerous others.⁷ Cluvius alone

³ See Verboven (2009). The concept was picked up recently by Jan Lucassen (2012) in a study on the monetization of India. I would like to thank the author for letting me read this paper before publication.

⁴ Aarts (2003); see also Aarts (2005).

⁵ Rathbone (1991: 326–30); Howgego (1992: 16–17); see the section below entitled 'Accounts and Written Documents'.

⁶ Verboven (2009).

⁷ On Cluvius and Vestorius see Andreau (1983); on Rabirius and his family see Siani Davies (1996: 207–40); for other examples see Rauh (1986).

held debt claims belonging to Pompey on five cities in Asia Minor. When he died, his house contained large amounts of cash and silver plate.⁸ Vestorius, who did business with Atticus and assisted Cicero in accepting Cluvius' inheritance, financed maritime trade as a go-between for senators and set up a workshop to produce Egyptian blue.⁹ Rabirius Postumus was a high-level tax farmer (*publicanus*), merchant/financier, and a go-between for his powerful friends, 'borrowing' from them at interest and lending the money at a higher rate to kings and cities.

The writing tablets from Pompeii and Herculaneum show that these connections continued under the Julio-Claudians. The C. Sulpicii from Puteoli, for instance, handled investments by imperial slaves and freedmen, and freedmen of the senatorial aristocracy.¹⁰ L. Cominius Primus from Herculaneum had business with the consular Cn. Sentius Saturninus,¹¹ and in AD 69 with Ulpia Plotina, the aunt of the later emperor Trajan.¹² Last but not least, the establishment of the military fleet at Misenum under Augustus boosted local monetized transactions as well, because it ensured a steady influx of coins in all denominations. So the Bay of Naples was a highly monetized zone. But how were monetized transactions handled in practice?

CURRENCY

Coins were by far the preferred monetary instruments in the Roman world. Their efficiency should not be underestimated. Provided the coin supply is large enough and the range of denominations wide enough to support both low- and high-value transactions, there is little need for alternative instruments such as commodities or bank or credit money. For instance, less than 8 kg of gold coin was enough to buy a farm large enough to qualify for a place in the local senate.

Nevertheless, the material nature of coinage poses constraints. Like commodity and bullion, the anonymity of coins make them vulnerable to theft. Their availability is always limited. They are susceptible to wear, forgery, and scraping. Physical transport poses both security risks and logistical problems.

⁸ Cicero, *Att.* 13, 45, 2–3: *multos nummos... numeratos... magnum pondus argenti*.

⁹ D'Arms (1981: 49–55).

¹⁰ Imperial slaves: *TPSulp.* 45; 51; 52; 67; 68 (Iulius Evenus Primianus, freedman of Tiberius); *TPSulp.* 49 (Cerinthus, freedman of Claudius); *TPSulp.* 69 (Phosphorus, freedman of Claudius); *TPSulp.* 94; 95 (Amaryntus Hyacinthianus and Phorus, freedmen of Claudius); *TPSulp.* 101 (Myrtillus, freedman of Tiberius); for senatorial families *TPSulp.* 73 (Lollia Saturnina, cf. *PIR* 2, L 329). On the Sulpicii and the remains of their archives see Camodeca (1999a); Verboven (2000; 2003a; 2003b).

¹¹ *AE* 2008, 361; Camodeca (2003: 235–41).

¹² *AE* 1993, 461.

The political nature of coins poses geographic restrictions on their use. The efficiency of coins as monetary tools, therefore, depends on the institutions and procedures that regulate their use and smooth the tensions caused by fluctuating supply and demand.

The coin supply in Campania was abundant. It was close to Rome, and was a centre for elite and military expenditure. The Augustan currency system linked denominations in three metals (gold, silver, copper/bronze) with widely different relative values. Low-value denominations in bronze were largely fiduciary; high-value gold coins relied on their intrinsic value. Silver denominations tended to float between these two. Hoards show selection of silver coins based on quality and weight, but worn silver circulated alongside freshly minted coins.

The ratio of silver to gold could be maintained because both had very different circulation spheres, as a result of which there was little competition between both as payment media. Gold and silver coins could be 'bought' from moneychangers, whose flexible commission rates effectively buffered supply and demand tensions.¹³ These professional money-dealers were also crucial in upholding the value of the bronze coinage. As long as they could be forced to accept coins at face value (minus exchange commission), the fiduciary bronze maintained its value. In addition, bankers and moneychangers monitored the quality of the coinage pool by testing coins for their intrinsic quality and genuineness. A writing tablet from the Sulpicii archives (found at Murecine near Pompeii but from Puteoli), for instance, records the testing by a *nummularius* of coins used in a transaction.¹⁴

But coins were more than lumps of metal. According to the jurist Paul, the 'usage and power' (*usum dominiumque*) of coins derived from their being *materia forma publica percussa*—'objects stamped with a public design'.¹⁵ This same view is implied for the late Republic in the *Lex de Gallia Cisalpina* (from 43 BC), that provided regulations for local trials in cases of default only for *pecunia certa credita signata forma publica populei Romanei*.¹⁶ The imperial portrait in particular boosted the status of coins as a means of payment. This was especially important for the fiduciary bronze coins. Epictetus notes how the imperial portrait made the acceptance of coins at face value obligatory for bankers and vendors.¹⁷ In some cases, *damnatio memoriae* could affect this legal tender guarantee, although hoards and coin finds clearly show it did not in itself demonetize them. Dio claims that, after Caligula's assassination, the

¹³ On the importance of moneychangers see Verboven (2007: 245–57).

¹⁴ *TPSulp.* 119 (the amount in question is unfortunately lost). Compare the 100 *aurei solidi* in Apuleius, *Met.* 10, 9, 1 that were sealed to be tested before the transaction took place. See *CIL* 10.3977 for a *nummularius* in Capua.

¹⁵ *Dig.* 18.1.1 (Paulus, *Ad Edictum* 3).

¹⁶ *Lex de Gallia Cisalpina* (*CIL* 1.591) XXI, 1.

¹⁷ Epictetus 3.3.3: *ὥς γὰρ τὸ τοῦ Καίσαρος νόμισμα οὐκ ἔξεστιν ἀποδοκιμάσαι τῷ τραπεζίτῃ οὐδὲ τῷ λαχανοπώλῃ, ἀλλ' ἂν δείξῃς, θέλει οὐ θέλει, προσέθαι αὐτὸν δεῖ τὸ ἀντ' αὐτοῦ πωλούμενον.* See also *Pauli Sententiae* 5.25.

senate decreed that all his bronze coins had to be withdrawn, and Statius scornfully refers to the *assis Gaianus*.¹⁸ Dio praises Vitellius for allowing the coinage of his 'damned' predecessors, Nero, Galba, and Otho to circulate.¹⁹ Yet, according to Epictetus, Nero's sesterces were commonly rejected.²⁰ Interestingly, this remark is archaeologically confirmed for Nero's bronze coins, but not for his silver and gold coinage. Stray finds at Pompeii suggest Neronian bronze made up 17 per cent of all coins, but hoards either predominantly consist of Neronian bronze or lack them altogether.²¹ Less than 1 per cent of the 1,300 bronze coins found in the bar area in the Casa di Vetutius Placidus (I 8, 8–9) are Neronian.²² Whether or not Gaius and Nero's bronzes circulated at a discount cannot be made out, but there was a clear bias against them.

Nearly 40,000 coin finds have been registered in Pompeii, Herculaneum, Stabiae, and the *ager Pompeianus*. In the town of Pompeii alone 766 *aurei*, 10,168 *denarii*, and 21,787 various *aes* denominations were recorded for a total (official) value of 248,212 sesterces, of which 66 per cent was in silver, 31 per cent in gold, and only 4 per cent in bronze. This is no doubt only a fraction of the coinage that actually circulated in the town. Only about 2,000 bodies have been discovered, while population estimates are usually between 8,000 and 12,000, and occasionally higher.²³ The whole town has not yet been excavated; the suburban outskirts are largely untouched. After the eruption valuables, including coins, were retrieved by their owners, families, or looters.²⁴ Last but not least, not all coin finds were properly registered since the beginning of the excavations in the eighteenth century. It is impossible to tell exactly how large the sample is compared to all coins circulating in the town, but in my view 10 per cent is a high upper limit (Table 12.1).²⁵ The total coinage supply in the

¹⁸ Dio 60.22.3: ἐκείνους μὲν δὴ τούτοις ἐτίμησαν, τῇ δὲ δὴ τοῦ Γαίου μνήμη ἀχθόμενοι τὸ νόμισμα τὸ χαλκοῦν πᾶν, ὅσον τὴν εἰκόνα αὐτοῦ ἐντετυπωμένην εἶχε, συγχωρευθῆναι ἐγνωσαν; cf. Statius, *Silvae* 4, 9, 22: *emptum plus minus asse Gaiano*; note, though, that the decree may not have demonetized the coins in circulation, for a discussion see Wolters (1995: 144–69); Barret (1999); Varner (2004: 24–5). See also Duncan-Jones (1994: 98).

¹⁹ Dio 65(64).5.3: τό τε γὰρ ἐπὶ Νέρωνος καὶ τὸ ἐπὶ Γάλβου τοῦ τε Ὀθωνος κοπὲν νόμισμα ἐτήρησεν, οὐκ ἀγανακτῶν ταῖς εἰκόσιν αὐτῶν.

²⁰ Epictetus 4.5.16–17: οἷους καὶ ἐπὶ τῶν νομισμάτων ζητοῦντες, ἀν μὲν εὖρωμεν, δοκιμάζομεν, ἂν δὲ μὴ εὖρωμεν, ρίπτουμεν. τίνας ἔχει τὸν χαρακτήρα τοῦτο τὸ τετράσσαρον; Τραιανοῦ; φέρε. Νέρωνος; ῥῆψον ἔξω, ἀδόκιμόν ἐστιν, σαπρόν.

²¹ Although we cannot exclude that they circulated at a discount; see, for instance, Statius, *Silvae* 4, 9, 22 *emptum plus minus asse Gaiano*, but against this Barret (1999: 88).

²² Duncan-Jones (2003: 173–5).

²³ Note, however, that the city suffered from continuous seismic activity from AD 62 onwards, which may have reduced its population by the time of the eruption. On pre-AD 79 seismic upheaval see Chapter 7 (this volume). See also Allison (2004).

²⁴ See, for instance, Casa dei Dioscuri where 'only' 45 gold coins, 2 silver *denarii*, and 163 *asses* were left (Breglia (1950: 47, 57). On post-eruption looting see also Chapter 7 (this volume).

²⁵ The estimates in Table 12.1 are unverifiable of course, but in my view an under-registration of only 30% and an ancient recovery rate of 10% are on the low side.

Table 12.1 Reconstruction of the amount of coins in circulation at Pompeii

	% of recorded finds	Number of coins to be added (value in sesterces)	Aggregated total (value in sesterces)
Recorded coin finds			248,212
Unrecorded finds	30%	99,285	347,497
Unexcavated parts	30%	104,249	451,746
Ancient recovery	10%	45,175	496,921
'Missing' coins (recovery rate: 20%)	400%	1,987,682	2,484,603

town of Pompeii alone, therefore, is likely to have exceeded 2.5 million sesterces, of which about 800,000 in gold (i.e. about 8,000 coins), about 1.6 million in *denarii* (i.e. 400,000 coins), and about 100,000 in various bronze denominations.

Coin finds outside the town are less numerous. It is likely that the stock of small change here was significantly smaller. As Peter Spufford noted for medieval Europe, farmers and peasants have less need of small change. They buy and sell bushels, not loaves, animals, not pounds of meat.²⁶ Nevertheless, the 1,350 *aurei* of the Boscoreale hoard (135,000 sesterces, more half the total value of coin finds in the town) are indicative of the substantial cash reserves held by Roman aristocrats in their country estates and villas.²⁷ We should not, moreover, underestimate the total currency stock held by non-aristocrats living in the *ager Pompeianus*. The fugitives who died in room 10 of the Villa in Oplontis carried with them over 18,000 sesterces worth in cash.²⁸ Given the wealth of the *ager Pompeianus*, the total available money stock there may have been as large or even larger as in the town, but with a much higher proportion in gold immobilized in money coffers.

Unfortunately, the finds themselves tell us little about the actual use of coins. Life in Pompeii did not stop instantaneously when Vesuvius erupted. Fugitives took valuables and money with them. The coins found with skeletons are a mix of (incomplete) savings, daily earnings, and pocket money. The coins found in the shops and houses reflect what fugitives left behind. Looting and salvaging after the eruption further complicate the picture. The average size of the hoards is six times the yearly subsistence for an adult, but the number of persons depending on this money or the time span over which the hoards were formed is unknown.

²⁶ Spufford (1988: 10).

²⁷ Compare, for instance, Cicero's 600,000 sesterces in cash in 45 BC (Cicero, *Att.*, 12, 25, 1); cf. also Plutarch, *Ant.* 4, 4; when Pliny needed 3 million sesterces to buy an estate, he felt confident he could rely on his mother-in-law's cash box (*arca*), implying that the lady had large cash reserves: Plin., *Epist.*, 3, 19, 8. On gold and silver in Pompeii see Andreau (2008); on cash reserves in general see Jongman (2003).

²⁸ Andreau (2008: 216); Castiglione Morelli (2000: 187–234).

The bar of Vetutius Placidus (I 8, 8) contained a considerable amount of small change, 374 *asses* and 1,237 *quadrantes* (total value slightly less than 171 sesterces).²⁹ Larger denominations, however, are totally lacking, presumably because the owner fled taking these with him or because they were kept elsewhere. The little box dropped at the entry of the Macellum contained 35 *denarii*, 354 sesterces, 188 *asses*, and 586 *quadrantes* (total value 577.6 sesterces).³⁰ The composition likewise suggests a provenance from a (work) shop, but without the selection that distorts the composition of the hoard in bar I 8, 8.

The skeleton material suggests that many (but not all) people customarily carried some pocket money with them. It also seems that savings (coins as well as gold and silver) were kept at home in *armaria* or private *horrea*, rather than in bank accounts. Shops kept money reserves both for daily transactions and for the purchase of supplies. Interesting as these observations might be, however, such 'information' is hardly surprising and does not tell us very much. To know about the use of coinage, we have to turn to written sources, primarily graffiti and writing tablets.

The famous Pompeian 'household list' graffito of house IX 7, 25 suggests a daily average spent on living expenses of approximately 28 *asses* (7 sesterces) for two adults and a slave.³¹ Seventy-five per cent of expenses consist of food, but some of these are luxuries, suggesting that the consumers in question belonged to the *plebs media*. Important categories like rent and clothing are missing so we should probably increase this figure a little, but, even so, a 'middling-class' family with two children or a slave would easily have got by with c.8–10 sesterces a day.³²

This is well above subsistence. A *modius* of grain cost between 12 to 30 *asses* in the town of Pompeii, suggesting subsistence levels in the range of c.115–300 sesterces a year per person.³³ A loaf of daily bread cost c.2 *asses* (c.182 sesterces a year).³⁴ The bottom wage for unskilled workmen may be deduced from a graffito attesting the rent of three slaves at 5 *asses* a day. At 225–50

²⁹ Breglia (1950: B59).

³⁰ Breglia (1950: B7).

³¹ *CIL* 4.5380. The graffito lists expenses from the eighth day before the Ides to the Ides, a period of eight days (not nine as Breglia [1950: 52–3] and others mistakenly assume). The month is missing, but it is presumably not a coincidence that the list starts the day after the Nones and ends with the Ides.

³² Breglia's 6–7 sesterces (1950: 52–3) makes no correction for missing expenses.

³³ Diehl 391 (12 *asses*); Diehl 392 (30 *asses*). The household list mentions a price of 16 *asses* for wheat, but the amount is not specified.

³⁴ *CIL* 4.5380 (the household list), *CIL* 4.8566. Other prices are 1.5 *asses* for a pound of bread (*CIL* 4.4227); 2.5 *asses* (*CIL* 4.8561); 3 *asses* (*CIL* 4.10674, but possibly as part of a prepared meal). The household list suggests an average expense on bread, wheat, and flour of 3.25 *asses* (about 296 sesterces a year) for an adult. One of Trimalchio's guests praises old times when a loaf of 1 *as* could feed two persons. This would work out at less than 91 sesterces a year per person, but the figure is clearly intended as exaggeratedly low (Petronius, 44.11).

working days this would imply an income of c.280–310 sesterces a year.³⁵ Not coincidentally, this figure is close to subsistence levels. For a town population of perhaps 7,000 adults and 3,000 children, yearly subsistence costs would be in the order of 1.5–2.5 million sesterces.³⁶ Actual income and expenditure was of course higher. The household list suggests yearly expenditure for the (upper?) *plebs media* at four to five times subsistence.³⁷ Figures for the elite must have been considerably higher, although we should keep in mind that aristocrats often consumed their own wines, oils, fruits, and so on, and bought luxury items elsewhere, such as Puteoli or Rome. A notional 7.5–12.5 million sesterces (five times subsistence) seems to be a high but not impossible estimate for yearly urban living expenses (i.e. not including investment costs and public spending).

Unfortunately, we can only make educated guesses about expenditure in the *ager*. If we double the estimates for the town we would get 15–25 million sesterces for the whole area. If we postulate an urbanization ratio of 20–30 per cent, this would imply an average of only 1.25–2 times yearly subsistence for the *ager*. For the whole population (town + *ager*) it would work out as 2–3 times subsistence: a high number in pre-industrial perspective and possibly too high even for Pompeii (which itself cannot be taken as representative for Italy or the empire as a whole).³⁸

Obviously, these are all very rough estimates. The figures for the *ager Pompeianus* are little more than computational guesses. Nevertheless, for the town of Pompeii, the low estimate of 2.5+ million sesterces currency supply would be more than enough to cover the high estimate of 7.5–12.5 million sesterces worth of urban private expenses.³⁹ The figures suggest average circulation velocities of roughly 2–5 (obviously lower in the case of gold coins, higher in the case of bronze). To put this figure in perspective we may look to the late eighteenth-century Dutch Republic. Van der Woude and de Vries estimated that the total money supply there exceeded half of the Republic's GDP—an unusually high figure for eighteenth-century Europe.⁴⁰

³⁵ Cf. Scheidel and Friesen (2009: 70).

³⁶ I use these figures as notional figures for practical purposes. Fewer people would imply lower aggregate consumption, but this would also affect the estimate for the coin supply because this was partly based on the 2,000 skeletons found in the town, which in that case would represent a larger proportion of the actual inhabitants at the time of the eruption.

³⁷ At 250 sesterces/year for subsistence it implies 3.9 to 4.8 times subsistence for an expenditure of 8 to 10 sesterces a day, respectively, for the 'IX 7, 25 household list' family. To bring the number down to 3.2 times subsistence requires estimating subsistence at 300 sesterces a year and family expenditure at 8 sesterces.

³⁸ On wealth and subsistence in the *ager Pompeianus* see also Chapter 2 (this volume).

³⁹ Gross domestic product (GDP) would be slightly higher because it includes investments, public expenditure, and net exports besides private expenditure, but these are unlikely to have been very large compared to private expenditure.

⁴⁰ Van der Woude and de Vries (1997: 88–91); cf. Jongman (2003: 185–7).

Our estimates suggest that the Bay of Naples may have experienced a similar (or only slightly lower) abundance of money. Let us not forget, however, that our region was at least as exceptional for the empire (or even Italy) as whole as the Dutch Republic was for Europe.

Shops and small business enterprises needed liquidity to buy supplies and materials. A graffito mentions the sale of Pergamene textiles for 15.5 *denarii*.⁴¹ One of the Sulpician tablets refers to the purchase of 58 pounds of ivory for 9 *denarii* per pound,⁴² another to a share of 3,000 sesterces in the profit of verdigris.⁴³ One of Caecilius Iucundus' writing tablets records the sale of a mule for 520 sesterces, a lot of boxwood for 1,985 sesterces, two slaves for 5,300 sesterces; on another occasion an unknown number of slaves were sold for 10,000–11,000 sesterces.⁴⁴

Iucundus also arranged the lease of publicly owned land and productive facilities. An estate, presumably with olives, was leased for 6,000 sesterces a year,⁴⁵ grazing land (*pasqua*) for 2,675 (sometimes paid in two instalments),⁴⁶ and a *fullonica* was leased for 1,652 sesterces a year.⁴⁷ These substantially higher figures are always expressed in sesterces, the general unit of account. Nevertheless, at least nineteen of Iucundus' auction receipts mention cash payments (*pecunia numerata*). Even the highest sum mentioned in the tablets—38,079 sesterces—was paid out in cash to the *dominus auctionis*. It would have amounted to 37 kg of silver or 3 kg of gold.⁴⁸

The needs of large-scale trade and big (agro-)businesses can be appreciated from the Sulpician archive of tablets found at Murecine and a few very similar tablets from two other businessmen in Herculaneum, Cominius Primus and Venidius Ennychus. As financial brokers and middlemen they had two kinds of clients. On the one hand, businessmen turned to them to finance their operations. On the other hand, 'investors' lent them money at interest directly or made use of their help to find reliable borrowers, arrange the necessary formalities, and follow up the debt. Among these 'investors' we find imperial slaves and freedmen and members of the senatorial and local elite, who had easy access to the much larger money stocks at Rome, Italy, and even the empire as a whole.⁴⁹

⁴¹ CIL 4.4074. ⁴² TPSulp. 101. ⁴³ TPSulp. 66.

⁴⁴ CIL 4.3340.1 (mule); 3340.5 (boxwood); 3340.49; 62 (slaves). The auctions he handled required an average of c.7,700 sesterces. Unfortunately, in most cases the object of the auctions is not specified, and obviously craftsmen and shopkeepers were not Iucundus' only customers.

⁴⁵ CIL 4.3340.138. ⁴⁶ CIL 4.3340.145–7.

⁴⁷ CIL 4.3340.141–4; possibly the *fullonica* refers to a tax contract.

⁴⁸ CIL 4.3340.10.

⁴⁹ Some scholars argue that the C. Sulpicii from Puteoli were *argentarii*—although operating at a much higher level of business than Iucundus. Against this see Verboven (2003b; 2008). Note also C. Sulpicius Faustus' background as a trader.

The Sulpician documents record sixty-one payments or acknowledgments of debt for a total value of c.1,022,000 sesterces. Most (twenty-nine) are loans with an average value of 10,791 sesterces, but some exceed 50,000 and even 100,000 sesterces.⁵⁰ Some payments were made in instalments. A receipt from AD 47, for instance, mentions payment of 30,000 sesterces in two instalments of respectively 28,000 sesterces and (two weeks later) 2,000 sesterces for a total debt of 50,000 sesterces.⁵¹ On the other hand, some payments cover more than one debt. A receipt from AD 51, for instance, records the repayment of a consolidated loan of 80,000 and 50,000 sesterces.⁵²

Surprisingly, despite the substantial sums involved, it seems that the Sulpicii primarily handled cash. The standard formula for stipulations of debt was that the debtor would pay back 'correctly and in good coin' (*proba recte dari stipulatus... spopondi*).⁵³ In two cases a loan is explicitly said to have been paid in cash (*numerata*), for 2,000 and 20,000 sesterces respectively.⁵⁴ A special category of tablets—the so-called *nomina arcaria*—record payments *numerata domo ex arca*. Four of these concern relatively modest sums of 500 to 1,600 sesterces,⁵⁵ but one concerns a sum of 30,000 sesterces (24.7 kg of silver, 2.16 kg of gold).⁵⁶

So, currency clearly provided the preferred payment mode for monetized transactions in the first-century Bay of Naples, even for considerable sums. Which denominations were used, however, is rarely clear. The writing tablets usually express sums in sesterces, the general unit of account. The graffiti, however, almost exclusively use *denarii* and *asses*, indicating that coin users thought of silver and bronze as related but nevertheless different systems. In the household list, for instance, we find an unspecified amount of oil bought for 1 *denarius* and 9 *asses* and *montana* (cheese?) for 1 *denarius* and 1 *as*. A graffito from Herculaneum mentions a tunic sold (or on sale) for 1 *denarius* and 7 *asses*.⁵⁷ Similar expressions of prices in *denarii* and *asses* are common also in the Vindolanda tablets,⁵⁸ and occur occasionally in epigraphy elsewhere.⁵⁹

⁵⁰ *TPSulp.* 94; 95 (50,000); *TPSulp.* 2; 3; 5; 6 (*vadimonia* for 50,000 sesterces); *TPSulp.* 69 (94,000 sesterces); *TPSulp.* 49 (125,000 sesterces); *TPSulp.* 74 (130,000 sesterces).

⁵¹ *TPSulp.* 72. ⁵² *TPSulp.* 74; roughly the value of the Boscoreale gold treasure.

⁵³ See, for instance, AE 1896, 21: *denarios ducentos qui s(upra) s(cripti) sunt probos recte / numeratos accepisse et habere*. On *probare* meaning 'testing a coin' see Bogaert (1976: 5–34).

⁵⁴ *TPSulp.* 50 (2,000); 53 (20,000); cf. also AE 1993, 460 (Herculaneum): 20,000 sesterces lent by Cominius Primus to the freedman Dec. Laelius Euphrosynus, who declared having received them in cash (*numerata accipi*) and committed himself to repay them in good coin (*proba recte dari stipulatus*).

⁵⁵ *TPSulp.* 60, 61, 62, 65, on the *nomina arcaria* see Verboven (2003b: 436–9).

⁵⁶ *TPSulp.* 63. ⁵⁷ *CIL* 4.10664; cf. also *CIL* 4.8868.

⁵⁸ See, for instance, *Tab. Vind.* 179; 182; 184.

⁵⁹ Cf. Mrozek (2000: 117), e.g. *ILLRP* 466 (5 *denarii*, 3 *asses* per foot (or *passus*?) for paving a road), AE 1993, 1190 (a list of prices scratched on a sherd for two varieties of wine and a cup).

Clearly the *as* served as the unit of account for small sums. Since *sesterces*, *dupondii*, and *quadrantes* make up c.55 per cent of the coin finds in Pompeii, the sums expressed in *asses* must have been commonly paid in various bronze denominations. *Denarii* too sometimes serve as unit of account. This is clear, for instance, in the graffito mentioning the price of Pergamene textiles as *denariis XV s(emissem)*, rather than 15 *denarii* and 8 *asses*.⁶⁰ Nevertheless, it seems that payments were normally made in the metals in which they are expressed, since we rarely find prices expressed in more than 16 *asses*—the equivalent of 1 *denarius*.⁶¹

The same, however, is not true for gold. Whereas the coin finds show that *aurei* were available, gold is never mentioned in any of the writing tablets or graffiti found in Pompeii, even for amounts that are much higher than 25 *denarii*, the formal equivalent of 1 *aureus*. Although to modern eyes it would seem logical that *aurei* were used for the larger sums mentioned in *sesterces*, this was most likely not the case. One of the Sulpician receipts records a repayment of 6,000 *denarii* to Sulpicius Cinnamus, who then paid 20,000+ *sesterces* to the initial creditor (keeping 1,000–3,000 *sesterces* as profit). The exceptional use of the term *denarii* in this tablet suggests that the money was paid in silver (c.23 kg).⁶² Two isolated tablets document a loan (*fenus*) of 1,450 *sesterces*,⁶³ guaranteed by two slaves (in *fiducia*), which the debtor agreed to pay back ‘in good silver’ (*HS nummis MLD argentum probum recte dari stipulata*).⁶⁴ In the *Digest* we find the case of a client asking his banker to close his account. The banker informed him that he owed his client 386,000 *sesterces* plus interest from various contracts, besides an unspecified sum in gold which the client had left with him ‘silently’ (*tacitam*). The gold was not a sealed deposit, since the text reads *summam aureorum* and not *aureos*, but it was clearly not intended to be used for payments.⁶⁵ Although *aurei* were part of the monetary system, they served primarily for savings and were not commonly used as means of payment. Payment in *aurei* was determined more by circumstance than by the amount of the sum in question.

Thus, *aurei* were no doubt preferred for travel money (*viaticum*) and were presumably used for exceptionally costly purchases, as, for instance, of landed estates or elite houses when payments of several hundreds of thousands

⁶⁰ CIL 4.4074. Similar expressions are common in the writing tablets from Vindolanda: ‘(*denarii*) CCLXXIII s(emis) (assis) I’ (no. 179), ‘(*denarius* II s(emissem)’ (no. 181).

⁶¹ An exception is CIL 4.4000: 16 *asses* for hay.

⁶² TPSulp. 75. See also AE 1991, 477 = AE 1993, 461 (Herculaneum): down payment of 1,000 *denarii* on a loan of 15,000 *denarii* (*scripsi/me accepiisse... in solutum ex/debito de denari(i)s/decem quinque milibus/denarios mille*).

⁶³ I.e. not from the Lucundus or Sulpicii archives, but found wrapped up in cloth with 3 kg of silverware.

⁶⁴ CIL 4.3340.154 (p. 454) = AE 1888, 21; CIL 4.3340.155 (p. 454) = AE 1888, 19 = AE 1889, 62.

⁶⁵ Dig. 2.14.47.1 (Scaevola, *Digestorum* 1).

or millions of sesterces had to be made. But these were not the only considerations that mattered. *Aurei* were especially favoured for instance in gifts signifying esteem.⁶⁶ At a handout in the early third century AD, *patroni* and *quinquennales perpetui* of the Corporation of Fishermen and Divers (*corpus piscinatorum et urinatorum*) at Rome, received one gold piece each, while the magistrates in charge received the formal equivalent of 25 *denarii*.⁶⁷ One of the favours Sennius Sollemnis received from his 'friend and patron' Claudius Paulinus, governor of Britain in AD 220, was that his salary was paid in gold.⁶⁸ The symbolic value of gold coin is nicely illustrated by Trimalchio's *dispensator* counting *aurei* in the atrium of the house,⁶⁹ and by the way in which one of the guests refers to the property qualification for municipal magistrates as *denarios mille aureos*.⁷⁰ Of course, the frequent mention of *aurei* in the *Satyricon* is also part of the style of this literary masterpiece.⁷¹

ACCOUNTS AND WRITTEN DOCUMENTS

As we mentioned, metal coinage can be an efficient monetary instrument. However, on its own, cash is useful only for on-the-spot payments. For complex arrangements, involving time lags, distances, linked transactions, and multiple agents, procedures are needed to specify and underpin agreements on who will do what, how, when, and where. There was no legal necessity for these agreements to be written down. Most Roman legal obligations rested on oral contracts (*obligationes verbi*), implied consensus (*obligatio consensu*), or intentional acts (*obligatio re*).

Five curious graffiti in Pompeii record loans for relatively small sums. The graffiti present formless lists or items. A woman, Somene, offered 50 *denarii* on loan at an interest of 1 *dupondius* (presumably) a month (3% a year).⁷² Two women, Vettia and Faustilla, recorded loans of 20 *denarii* at 12 *asses* interest, 15 *denarii* at 9 *asses* interest, 2 *denarii* minus 1 *as* per *denarius* as interest (guaranteed by a pair of earrings), and 50 sesterces minus 13.5 *asses* interest (guaranteed

⁶⁶ Mrozek (1973). ⁶⁷ CIL 6.29700; Mrozek (1978: 85).

⁶⁸ CIL 13.3162. cf. Devijver (1976–2001, II: 729–30, IV: 1718). See also Martial 12.65.5 for 10 *aurei* as a lover's gift.

⁶⁹ Petronius 30.9. ⁷⁰ Petronius 44.14.

⁷¹ Petronius 76.7 (Fortunata sells jewellery and clothes to give 100 *aurei* to Trimalchio to save his business); Petronius, 137.7 (Encolpius gives 2 *aurei* to appease an old woman, a keeper of holy geese); Petronius 13.3 (*aurei* hidden in the hem of a tunic). Compare also other authors: e.g. Martial, 9.4; 10.75; 12.55; Apuleius, *Met.* 10.9.1 (100 *aurei solidi* for poison). See Mrozek (1973: 335–6); Verboven (2007: 249–50).

⁷² CIL 4.5123.

by two cloaks).⁷³ While it cannot be excluded that these loans were also recorded in sealed tablets, this may not have been the case. The graffiti could have been intended simply as reminders or checklists for oral contracts. Informal loans and credit facilities (as surety or sales on credit) from relatives, friends, or members of the same *collegium* formed the vast majority of credit arrangements in the Roman world as they did in most other pre-industrial societies. Relations of trust and concern for reputation could extend the range to which currency could be used.

Nevertheless, without proper records loans could hardly be more than means to raise money for on-the-spot transactions. For larger sums and regular loan practices written documents were necessary to secure oral and consensual arrangements. Although Roman accounting never attained the level of early modern double-entry bookkeeping, it played a central role in patrimonial management and business.⁷⁴ Any *pater familias* who could not produce his accounts was suspicious. Unfortunately, except for two small fragments, the writing tablets preserved in Pompeii and Herculaneum are not part of the accounts *stricto sensu* (*rationes, tabulae/codices accepti et expensi*) of their owners.⁷⁵ They are documents intended to provide proof that obligations had been created, guaranteed, or extinguished. They are, however, closely connected with the accounts. One particular type of tablets, the so-called *nomina arcaria*, for instance, almost certainly refers to the *codex accepti et expensi* of the contracting parties.⁷⁶ Together with the accounts *stricto sensu*, the tablets found in Pompeii and Herculaneum are part of an elaborate system intended to create and discharge monetized obligations that allowed transactions to be linked and spread over time and/or agents.

The simplest way in which transactions could be 'stretched' in time was through sale credit. Sales on credit have been important mechanisms to conclude monetized transactions without cash at hand by simply inserting a time lag between delivery and payment. By doing so, sale credits smooth the tensions caused by a largely inelastic money stock facing periodic or temporary rising demands for money. Retail credit sales (in bars and shops) were probably as common in the Roman Empire as they were in medieval and early modern Europe.⁷⁷ Unfortunately, because most were not recorded in writing they left no traces. When the purchase sum was more important, however, written records could be drawn up to register the debt.⁷⁸ A tablet from

⁷³ CIL 4.4528; 8203; 8204; cf. also CIL 4.10106 (*denarios*) *X usura ded(ucta)*; and perhaps also CIL 4.8565b.

⁷⁴ On Roman accounting see Sainte Croix (1956); Thilo (1980); Minaud (2005).

⁷⁵ *TPSulp.* 94; 95.

⁷⁶ On these see Camodeca (1999a: 151–60); Verboven (2003b: 436–9).

⁷⁷ See Verboven (2009: 116–17). On the ubiquity of sale and consumer credit in early modern Europe see Dyer (1989); Nightingale (1990); Muldrew (1993).

⁷⁸ See Gaius 3.130 (*nomen transcripticium a re in personam*).

Herculaneum documents the contract of debt concluded in Nola in AD 40 for the sale of part of the wine harvest for 1,800 sesterces, payable in four months' time, presumably after the buyer had sold the wine himself to merchants or retailers.⁷⁹

An important feature of the Roman financial system of the late Republic and early empire, however, was that professional bankers (*argentarii*) stepped in as middlemen to arrange auctions. The banker paid the vendor (the *dominus auctionis*), while the buyer contracted to pay the *argentarius*. The vendor paid a commission to the banker but in return was certain to be paid on the spot. The buyers could pay the *argentarius* immediately or request a short-term loan. Seventeen of Iucundus's tablets refer to such loans.⁸⁰ Unfortunately, no tablet recording the contract made between the Pompeian *argentarius* Caecilius Iucundus and a buyer has survived. The preserved tablets are all receipts from vendors. So, the details of Iucundus's business escape us. Clearly, however, the system made it easier for retailers and craftsmen to buy supplies. In the case of the stock of boxwood, for instance, Iucundus paid the vendor cash (*numeratos*) on 10 May, but the buyer had to pay Iucundus only on 15 July.⁸¹

Direct sale credit (between vendors and purchasers) and sale credit mediated by *argentarii* greatly eased the discrepancies between the demand for cash and its availability. But delayed payments are not enough to keep business going. Throughout history, private account rationing—writing off reciprocal debts and credits—has been a major technique to arrange cashless monetized transactions. It merely requires that both parties do business with each other on a more or less regular basis. The technique lay at the root of financial developments in the Middle Ages that would lead to the bill of exchange and all later sophisticated paper payment instruments, but is well attested also in the Roman world in literary and legal texts. Closely connected with account balancing are third-party payments and transfer of debt claims. In Roman law these were known as *delegatio debitoris* and *nomina transcripticia* respectively. In the case of a simple *delegatio* a creditor asks his debtor to pay a third party to whom the creditor himself owes money. The creditor's own debt to that third party is thereby extinguished. The debtor's payment on behalf of his creditor creates a claim that can be written off ('balanced') against his debt. In this way, two debts are paid by a single cash payment. The situation is similar

⁷⁹ AE 1999, 449 *ob fructum fundi Cadiani venditum*; the date (16 October, AD 40) shows that the sale was that of the wine harvest. The money had to be paid by 1 March, AD 41. The owner, Herennia Tertia, is represented by a slave (possibly the *vilicus*), the buyer is a freedman by the name of L. Annius Agathemer. Cf. Camodeca (1999b). Whether the sale had been pre-arranged before the harvest as was often the case, cannot be made out. See Cato, *Agr.* 147 for a general example of advance harvest sales. Plin., *Ep.* 8.2 for a famous example, showing that pre-arranged sales did not imply advance payments. For other examples: Plin. *N.H.* 14.50; *Dig.* 18.1.39.1; 19.1.25. Erdkamp (2005: 120–7) for a discussion.

⁸⁰ Cf. Andreau (1974: 95–103).

⁸¹ *CIL* 4.3340.5.

in the case of *nomina transcripticia*, but instead of the third party being paid directly in cash, he accepts an acknowledgment of debt from the ‘delegated’ debtor in lieu of payment. This acknowledgment is registered in the accounts of the third party as a legally enforceable *nomen transcripticium* requiring no extra contract between the third party and the debtor. According to Roman law, the arrangement constitutes a renewal of debt (*novatio debiti*) that cancels the creditor’s debt to the third party. Because the ‘delegated’ debtor has now obliged himself to the third party on behalf of his creditor he again acquires a claim on his creditor that can be written off against his debt. If necessary, the creditor can easily (and formlessly) guarantee the *nomen transcripticium* by commissioning the third party to accept it (*mandatum pecuniae credendae*). Thus, again two debts are paid by a single delayed payment. The main legal limitation of *delegatio debitoris* was that a creditor could not force a debtor to pay his debt to a third party, but this could be circumvented by appointing the third party as the creditor’s agent (*procurator*) with a commission to cash in the debt. Such an appointment, however, could be revoked at any time and ended ipso facto in the event of the creditor’s or the agent’s death. *Nomina transcripticia* always required the consent and goodwill of all those involved. *Delegationes* and *nomina transcripticia*, therefore, could never be taken for granted. In practice, however, these difficulties were easily overcome if the parties involved shared relations of trust. Thus, within trust networks, *delegationes* and *nomina transcripticia* were no doubt effective procedures by which to handle monetized transactions.

Personal relations and trust networks are essential in private account rationing. In the Roman world of business, the need for debt rationing and proper registration created a market for private bankers to provide mediation. The main ‘asset’ of bankers like Caecilius Iucundus and financial brokers and businessmen like the Sulpicii, Cominius Primus, and Venidius Ennychus was that their business networks connected the networks of the landed aristocracy with those of maritime trade, and those of separate trading families and groups from various parts of the empire with each other. Hence, in at least eleven transactions (out of c.60) recorded in the Sulpician tablets, no Sulpicius is mentioned. The dossier of Novius Eunus, who borrowed 13,000 sesterces from the imperial freedman C. Iulius Evenus, shows how Sulpicius Faustus at first merely acted as a go-between and was only later involved as *adiectus solutionis causa*—giving him the right to sue Eunus for payment.⁸² In the case of the boxwood auction, the vendor (*dominus auctionis*) declared that he had received the money in cash (*numeratos*) from M. Fabius Agathinus in Caecilius Iucundus’ name. Agathinus was a regular business partner of Iucundus. He served as a witness in another tablet,⁸³ and possibly as the person making a

⁸² TPSulp. 45; 51; 52; 67; 68.

⁸³ CIL 4.3340.91.

payment in yet another tablet.⁸⁴ Eight years later, Iucundus paid 2,520 sesterces in Agathinus's name for a contract the latter had as tax collector for the market tax of the city of Pompeii.⁸⁵

The most elaborate business relation is found in a document of the Sulpician archive that records a *mandatum* by which C. Iulius Prudens commissions Sulpicius Cinnamus to support Prudens's agents financially in all possible ways. In addition to the *mandatum*, Prudens accepts a *stipulatio* for all financial risks.⁸⁶ No doubt, contracts were made and recorded in writing each time that Cinnamus helped Prudens's agents. Through his mandate and *stipulatio* Prudens guaranteed all of these contracts even when he was not explicitly mentioned in them. Arrangements of this kind inevitably gave rise to numerous transactions susceptible to balancing, third-party payments, consolidation, and the like. Debts could easily be reshuffled and balance of payments turned into a new debt.⁸⁷ This is probably what lies behind most of the so-called *debita in stipulatum deducta*, recording formal contracts for debts (*stipulationes*) for which no legal grounds or payment of loans are specified. One of the tablets explicitly states that the money owed is 'the money remaining, after calculating the entire account, from what I have accepted in loans' (*nummos reliquos ratione omni [sic] putata quos mutuos accepi*).⁸⁸

Some tablets explicitly mention other loans or payments. A *nomen arcarum* of Cominius Primus records the cash payment of a loan of 1,000 sesterces to Pompeia Anthis, 'besides 10,000 sesterces in other tablets' (*praeter aliis tabellis HS X milia*).⁸⁹ Pyramus, the slave agent of Caesia Priscilla, borrowed 4,000 sesterces from Sulpicius Cinnamus 'besides 20,000 sesterces to the account of my Mistress' (*praeter HS viginti milia nummum in rationem... dominae meae*).⁹⁰ Presumably, third-party balancing operations lurk behind a number of other tablets. Thus, for instance, when Cinnamus received a payment of 130,000 sesterces of which 50,000 were intended for his patron Faustus, Cinnamus and Faustus presumably just balanced their accounts afterwards.⁹¹

⁸⁴ CIL 4.3340.57; on their relation see Andreau (1974: 45–7).

⁸⁵ CIL 4.3340.151. ⁸⁶ TPSulp. 48.

⁸⁷ Note, though, that compensation was not automatic in Roman law (except for *argentarii*), another reason why the Sulpicii were probably not *argentarii* since it would have made the *debita in stipulatum deducta* unnecessary.

⁸⁸ TPSulp. 68.

⁸⁹ AE 1993, 462a; cf. also AE 1993, 462b: 600 sesterces *praeter alios HS ∞ CCC*.

⁹⁰ TPSulp. 58; see also TPSulp. 71 where C. Iulius Amarantus acknowledges receipt of 3,000 sesterces from Pyramus. For other examples see TPSulp. 52; 57; 58; 61.

⁹¹ TPSulp. 72; see also TPSulp. 72 for a receipt of 30,000 sesterces by Cinnamus on behalf of his patron Faustus. Cf. perhaps also TPSulp. 66: *cautio* for 3,000 sesterces owed by a M. Caecilius Maximus as profit on a sale of verdigris in which Sulpicius Faustus had participated as silent partner. If Faustus and Maximus were regular business partners (as I think is likely) this *nomen* could easily have been used for balancing accounts.

Delegatio debitoris or *nomina transcripticia* are not directly attested in any of the Campanian writing tablets. Possibly a number of *debita in stipulatum deducta* were supplementary contracts (*cautiones*) guaranteeing *nomina transcripticia*. But we cannot be sure of this. In my view, the absence of ‘delegated’ debt payments and transferred claims in the tablets is a coincidence. The legal technicalities of *delegatio debitoris* are explained in the *Digest* with numerous examples, showing that they were common in maritime trade.⁹² Gaius’s basic introduction to Roman law discusses *nomina transcripticia* together with Greek *syngraphae*.⁹³ Given that *delegationes debitoris* and *nomina transcripticia* were common among maritime traders, the Sulpicii must have used them. Several foreigners are attested among the Sulpicii’s clientele from Athens, Melos, Alexandria, and Ceramus in Caria.⁹⁴ At least some of these resided in Puteoli. *TPSulp.* 80, for instance, is a freight letter of a Greek merchant written to his partner in Puteoli. Euplia from Melos, daughter of Theodorus, and her guardian received several loans in Puteoli from Cinnamus and a woman named Titinia Antracis.

Private account rationing greatly boosts the potential of the available stock of metal currency. Although *nomina* could not circulate freely (and were not therefore an alternative to coins in the way that letters of credit would become in early modern Europe), account rationing assisted by skilled financial middlemen made it possible to realize monetized transactions in the physical absence of coins, thereby greatly increasing the intensity with which a given stock of money could be used.

Current accounts with bankers take the account mode a step further. In private account rationing agents need to match their accounts, alone or with the help of brokers. Deposit bankers offer the possibility to ‘host’ accounts. Contrary to debtors in the case of *delegatio*, deposit bankers could not refuse payment orders. When they accepted payments on behalf of their clients, the registration in their clients’ account discharged the payer. Through the *receptum argentarii* they could promise a third party—without further formalities—to pay a client’s debts. When two persons had an account with the same bank, payments between them could be made by debiting and crediting their respective accounts. When bankers cooperated in a *societas* or opened current

⁹² See Verboven (2009: 113–17) for a discussion and further references.

⁹³ Gaius, 3.130.

⁹⁴ *TPSulp.* 4 and 5 (*vadimonia* for 3,000 sesterces by Trupho, son of Potamon, from Alexandria to Sulpicius Cinnamus); *TPSulp.* 49 (*mandatum* by Purgias, son of Alexander to Sulpicius Cinnamus to hand over African and Italian wares to an imperial slave as security for a debt of 125,000 sesterces); *TPSulp.* 60; 61; 62 (*nomina arcaria* attesting payment of loans of 1,600, 500, and 1,000 sesterces by Titinia Antracis and Sulpicius Cinnamus to Euplia, daughter of Theodorus, from Melos, guaranteed through *fideiussio* by her guardian Epicharus, son of Theodorus, from Athens); *TPSulp.* 78 (acknowledgment of acceptance of 1,000 *denarii* on loan (!) with regard to a sealed freight contract (*naulotika*)); *TPSulp.* 106 (something regarding fraud on a ship in which a Theodorus was involved).

accounts with each other, giro payments like these could be arranged between clients from different bankers. It should be noted, however, that inter-bank giro payments are unattested and, in the absence of central clearance agencies and corporate capacity to ensure continuation in the event of the banker's death, it seems unlikely that they were very common.⁹⁵

Deposit accounts allow the use of fractional reserve banking. Because clients rarely demand all their money back at once, the banker can use the deposited sums to extend loans in his own name. Andreau showed that Roman *argentarii* did so primarily (but certainly not only) in the form of auction credits. This was a relatively low-risk type of business: the loans were short term; the borrowers were a mix of local craftsmen, shopkeepers, and private consumers; and most of the sums were relatively modest. Caecilius Iucundus was such an *argentarius* in Pompeii. Like most of his colleagues he specialized in auctions, but his core business was deposit banking (*res argentaria*). Unfortunately, the preserved remains of his archives barely document this aspect of his business. They are all receipts (*apochae*).⁹⁶

As we have already seen in the section 'Currency', nineteen tablets explicitly attest payments in cash (*pecunia numerata*). The others use more general terms, such as *persoluta habere* or *nummos accepisse*. Document no. 23 shows that the use of the term *nummi* does not necessarily imply cash. The slave agent of Umbricia Antiochis, auctioning furniture, declares having received a total of 645 sesterces (*sestertios nummos*), but these were 'received' first by an instalment of 200 sesterces, then 20 sesterces worth of 'arbitrations' (*arbitria*), 13 sesterces worth of 'increases' (*accessiones*), 51 sesterces were deducted as payment for Iucundus's services, and only then was the remainder of 360 sesterces paid out. Although the exact meaning of *arbitria* and *accessiones* is not clear, the document shows that the formula *accepisse nummos* need not be taken literally.⁹⁷ Twenty tablets contain the formula *persoluta habere* ('to have (as) repaid'), which Andreau believes signifies 'paid into the account of' because it never occurs in the same tablet as *numerare*. The expression with *habere* is certainly odd, but we should be wary of putting too much faith in words. *Persolvere/persolutio* is a common term to denote fulfilment of debts. It occurs frequently in a metaphorical sense in inscriptions to denote fulfilment of moral debts.⁹⁸ It occurs thirteen times in twelve paragraphs in the *Digest*, always

⁹⁵ On Roman banking see Andreau (1987; 1999). On the legal framework see Petrucci (1991) and (for a minimalist interpretation) Bürge (1987). On the *receptum argentarii* see Andreau (1987: 597–602; 1999: 43–4); Bürge (1987: 527–36); Petrucci (1991: 378–83).

⁹⁶ Andreau (1974).

⁹⁷ *CIL* 4.3340.23. See in this sense also Verboven (2003c). Note that the total amounts to 644 sesterces, not 645. Could it be that the final 360 sesterces were paid as 90 *denarii* and Antiochis renounced the 1 *sesterce* that would have to be paid in bronze?

⁹⁸ For instance, Rodríguez Colmenero (1997: 324) (*pietate sua iustum persolvit amorem*); Scheid (1998: 32) (*quae voverat persolvit*); *CIL* 2, 172 (p. 692, 810, 1048) (*quoad poenas persolverit*).

in the very general sense of ‘to extinguish a debt’.⁹⁹ While it is true that debts can be extinguished in many ways, payment in cash (*numerare*) is clearly one of them (and probably the most important). A passage from Iavolenus’ *Epistulae* (Dig. 19.2.21.pr.) links *pecunia persoluta* with *pecunia numerata* (although not with *persoluta habere*). Only one tablet certainly refers to money kept on deposit with Iucundus. The client—a slave—acknowledges having received the proceeds of an auction: *minutatim quemadmodum volui in hanc diem*; that is, the client resorted to the money whenever he needed to. Unfortunately, whether he did so by using payment orders to third parties, or by making withdrawals when needed, is unknown.¹⁰⁰

I have argued elsewhere that the Sulpicii from Puteoli were highly skilled financial middlemen—bankers in the non-specific sense of the word—but not deposit bankers, and will not repeat my arguments here.¹⁰¹ In any case, the Sulpician tablets provide a wealth of information on financial affairs, but no information whatsoever on current accounts. Their *nomina arcaria* document payment *domo ex arca*; no tablet documents a payment *de mensae scriptura* as would be the expression for a payment through a banker.¹⁰²

MISSING MODES

Currency mode payments and account rationing aided by specialized middlemen are well attested in the Bay of Naples area. Current accounts are not, but Caecilius Iucundus most likely did offer this service to his clients. Two payment modes, however, are unaccounted for: ‘commodity mode’ payments and ‘internal account rationing’.

Commodity mode payments use commodities with an agreed estimated value to make payments expressed in money. The unit of account is monetary (in this case, sesterces) but the instrument used is a commodity. Commodity mode payments should not be confused with barter or obligations (taxes, rents...) expressed in kind, in which case values are not expressed in monetary terms but in fixed amounts or percentages (for instance of the harvest). There is no doubt that commodities played a major part in wealth storage and payments in kind of rents and taxes in the Roman world. How barter and payments in kind relate to the monetary system is a topic that certainly deserves more attention. The use of commodities to fulfil monetary obligations directly, however, is rarely attested

⁹⁹ Dig. 12.6.25.pr; 19.2.21; 2.25; 22.3.25.3; 24.3.66.3; 31.1.89.4; 38.5.1.13; 41.4.2.4; 42.1.49.pr; 43.26.20.pr; 46.3.68; 50.17.186.pr.

¹⁰⁰ CIL 4.3340, 6.

¹⁰¹ Verboven (2003b; 2008); in the same sense Andreau (1995; 1999: 71–9).

¹⁰² Cf. Donatus. *ad Ter. Phorm.* 922; *ad Ter. Adelph.* 277; see Verboven (2003b: 439) for a discussion of these terms.

for the Roman world. The main exception is gold bullion that functioned as a monetary instrument during the Republic. Under the empire, this role of gold bullion was taken over by gold coins in a fixed relation to silver and *aes* coinage. Gold and silver plate, however, continued to play an important role for wealth storage and as objects that could easily be sold or pledged to raise money when necessary.¹⁰³ A passage in the *Digest* mentions the deposit of 10 pounds and two discs of gold in a sealed bag, which were apparently intended to guarantee or pay debts.¹⁰⁴ One of the Sulpician tablets documents a loan of 5,000 sesterces guaranteed by over 10 pounds of silver sealed in a bag.¹⁰⁵ Although gold plate seems to have been relatively rare in Pompeii, silverware and gold jewellery are commonly found together with gold and silver coins.¹⁰⁶ We already mentioned (n. 63) the two loan tablets wrapped in cloth with 3 kg of silverware.¹⁰⁷ The most spectacular example is the chest found in the Casa del Menandro containing 13 *aurei*, 33 *denarii*, gold jewels, and 118 various silver objects.¹⁰⁸

Internal account rationing is a system to arrange payments within large organizations like landed estates or army camps. Units and individuals receive accounts which they can use, for instance, to 'buy' estate produce or from which they can make withdrawals. It is well documented for large estates in Egypt,¹⁰⁹ and for the Roman army.¹¹⁰ Unfortunately, no information is preserved on the practice in Campania, although we can be fairly sure that the payment system used in the *Classis Misenatium* was similar to that documented elsewhere: the soldiers did not receive their pay in cash (except perhaps for donatives in gold and silver), but were given a personal account with the camp's financial administration from which they could make withdrawals and from which they might make purchases from the army stores. Unfortunately, whether the practice was also common on landed estates—as it was in Egypt—cannot be made out.

CONCLUSION

Money in Campania was primarily coinage, but to describe the system as a cash economy is widely off the mark. Coins were merely an instrument

¹⁰³ See Lo Cascio (2008). ¹⁰⁴ *Dig.* 16.3.26.2 (Paulus, *Responsa* 4).

¹⁰⁵ *TPSulp.* 55; no Sulpicius is mentioned in the tablet, the loan was accorded by Sex. Granius Numenius to P. Vergilius Ampliatius and the pledge was given directly to Numenius.

¹⁰⁶ Andreau (2008: 216–17).

¹⁰⁷ *CIL* 4.3340.154 (p. 454) = *AE* 1888, 21; *CIL* 4.3340.155 (p. 454) = *AE* 1888, 19 = *AE* 1889, 62.

¹⁰⁸ Painter (2001).

¹⁰⁹ Verboven (2009: 119); Rathbone (1991: 326–30); Howgego (1992: 16–17), cf. also Von Reden (2001: 70).

¹¹⁰ Verboven (2009: 118–19).

within a payment and valuation system that hinged on credit and accounting instruments. The institutional framework of the system substantially reduced the transaction costs inherent in using metal currency. Moneychangers guaranteed the quality of coins and the interchangeability of denominations in various metals. *Argentarii* offered flexible credit facilities to supplement sale credit. Legal regulations allowed the transfer of debts (*nomina*) within trust networks. Financial brokers and middlemen linked landed wealth and political elites to commercial wealth and merchant networks. While it is true that modern paper instruments like the bill of exchange were absent and obligations never ceased to be personalized, bankers, brokers, and middlemen eased contacts between unrelated agents or networks linked only through weak ties. Most of all, perhaps, the available money stock seems to have been vastly more abundant than in late medieval Europe and presumably than in the rest of the empire.

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Conflicts, Contract Enforcement, and Business Communities in the Archive of the Sulpicii

Wim Broekaert

During the early empire, the main port serving the markets of Rome was not Ostia. Only the decisions of the emperors Claudius, Nero, and Trajan to build vast artificial harbour facilities from the later first century onwards promoted both Ostia and Portus to major commercial centres in the Mediterranean where much of the goods consumed in the capital passed through. During the first decades of the first century AD, on the other hand, Italian maritime trade was concentrated in the Bay of Naples and the harbour of Puteoli in particular. Neighbouring port cities along the shores of the bay were also closely integrated into the supply network stretching from Puteoli to the capital, and cities such as Neapolis, Surrentum, and Pompeii were all partaking in and benefiting from this thriving business life. Still, many aspects of these early imperial trade links and business communities in the Bay of Naples remain unexplored, despite the extraordinary nature of the available evidence. When the eruption of Mount Vesuvius brought life in the Bay of Naples to a temporary standstill, some of these cities became frozen in time, urban laboratories waiting for future historians to try and unravel the architectural characteristics of Roman towns, their levels of production and exchange, and local and supra-regional connections.¹ The last topic, the integration of urban economies into wider business networks, will be discussed in this chapter. Starting from the archive of the Sulpicii found near Pompeii, the focus will be on how people dealt with fraudulent business partners. By analysing one of the main risks in trade and the specific solutions adopted in the port cities of the Bay of Naples, I will argue that commercial exchange in this region profited considerably from the

¹ On the degree to which Pompeii should be seen as a ‘snapshot’ see also Chapter 7, this volume.

existence of close-knit, face-to-face business communities, connecting cities like Pompeii and especially Puteoli to markets not only in Italy but also in the wider Mediterranean.

A WORLD RIFE WITH DANGER

In antiquity, commerce was not a profession for the faint-hearted. Risks and uncertainty abounded and continuously hampered exchange. Storms could force a shipper to jettison his cargo or wreck his ship, and banditry endangered not only a merchant's profits, but also his life. For every business venture, potential risks and profits needed to be weighed up very carefully, even though current and reliable information on markets, shortages, and supplies may not always have been readily available, and what initially seemed to be an interesting trading opportunity might turn out to be a complete disaster. Identifying a target market, calculating the costs of buying and transporting merchandise, finding customers, and selling for reasonable prices that would cover the initial costs was a formidable task, requiring a capable, well-informed, but also fortunate merchant. Doing business was thus a difficult profession, fraught with danger and insecurity.²

The fraudulent business partner was one of these risks, and a threat every merchant was bound to encounter sooner or later. Businessmen always had to reckon with customers seizing the merchandise without paying, creditors refusing to reimburse the loan, or partners stealing common profits.³ Commerce provided many opportunities for cheating, most importantly because merchants often did business in distant regions with people whose character and trustworthiness they were not directly familiar with. This danger of being cheated was one of the main potential costs in exchange. Whenever people involved in commerce tried to cheat one another, they not only faced direct financial loss, but also lost time in either trying to reach an informal agreement or awaiting compensation in court.⁴

The following sections will explore how merchants tried to cope with commercial conflicts and what legal recourse they could turn to. Attention will be given to the role of Roman law in finding compensation. The, first section, 'Action Galore', will succinctly discuss various legal constructions which shaped Roman commerce and the possibilities in finding compensation when being cheated by business partners. In the second part, 'Judges and Colleagues', I will analyse the importance of Roman law in conflicts between

² Morley (2007: 26–34); Bang (2008: 131–201).

³ Morley (2007: 58–60).

⁴ These risks in commercial exchange have been analysed in great detail within the framework of the new institutional economics. See e.g. North (1971); Greif (1989); North (1991); Greif (1993); and Frier and Kehoe (2007).

businessmen by a close reading of the tablets from the famous archive of the Sulpicii. The nature of the evidence will cause the major part of the argument to focus on the business community of Puteoli. Yet the frequent connections between the entrepreneurs active in Puteoli and the commercial communities in other cities in the Bay of Naples, including Pompeii, will highlight how strongly these cities were interlinked and how very similar characteristics of merchant networks dominated exchange in this region. The third section, 'The Power of Close-Knit Business Communities', will then describe an alternative system to solve conflicts, which businessmen all over the Roman Mediterranean used to enforce decisions.

ACTION GALORE: ROMAN LAW AND FINDING COMPENSATION IN COMMERCIAL CONFLICTS

A society's legal system is usually deemed a key determinant of economic development. Legal institutions shape economic organization and determine levels of economic performance and efficiency. More specifically, when law guarantees the enforcement of property rights and low levels of transaction costs, the legal environment is expected to favour economic growth.⁵ The latter aspect in particular, saving on transaction costs, is crucial for a favourable business climate. If businessmen, finding themselves entangled in commercial conflicts, are unable to obtain swift restitution in court, the risk of being cheated will soon outweigh the initial attraction of business opportunities and commerce will come to a halt. The legal system of the Roman Empire apparently recognized the necessity of a body of laws supporting commerce and protecting the interests of businessmen, and covered many aspects of commercial conflicts by offering a variety of legal actions (*actiones*) to the defrauded party. This is not the place for a thorough analysis of all opportunities to find redress in court. A brief sketch of the most important actions relevant to businessmen will suffice to stress the detailed and coherent discussion of commercial conflicts in Roman law. We will consider possible actions in case of partnerships, business deals involving agency, and standard transactions.

Litigation and Business

First, Roman law recognized that merchants often wished to cooperate with colleagues, shipowners, moneylenders, and other businessmen, in particular to

⁵ Frier and Kehoe (2007); Malmendier (2010).

organize and finance large-scale enterprises, and thus provide the opportunity to enter in a partnership (*societas*). This legal institution gave Roman businessmen the opportunity to join forces and support each other by pooling resources and sharing risks.⁶ The *societas* was a very flexible commercial tool, in which profits and losses were shared and each partner was allowed a contribution in money, labour, or merchandise as suited best with his opportunities. In case of discord, each partner had the right to immediately end the cooperation and take legal action against his partners by using the *actio pro socio* to reclaim his investments.⁷ This way, all partners were protected by law, in case one of them failed to fulfil his obligations. The necessity of the security offered by the *actio pro socio* is aptly illustrated in the speech of a businessman present at Trimalchio's dinner. He relates how he had once joined a *societas*, but as soon as it became clear that the enterprise would end in disaster, his partners tried to escape responsibility.⁸

A second feature of Roman business was the omnipresence of agency by slaves and freedmen. In virtually every sector of the Roman economy, agents were appointed to manage the investments of their masters and patrons.⁹ Yet, when doing business with managers, it is crucial that the liability of both the principal and his agent in the transaction are carefully established. Third parties may wish to recover damages from the principal, in case the agent's resources prove to be insufficient. Roman law therefore tried to define quite meticulously the liability of all parties involved in the transaction and granted several *actiones*, each of them adapted to a particular level of agency and the agent's legal personality. Most conflicts in transactions involving agency are covered by one of the six *actiones adiecticiae qualitatis*.¹⁰ Four of those actions were granted to creditors who had done business with managers *alieni iuris*—slaves and non-emancipated sons. The *actio de peculio* could be used when a slave or son had incurred debts while investing his *peculium*. The principal was then liable for debts up to the amount of the *peculium*. The *actio de in rem verso* was applicable to those cases in which the principal had benefited financially from his agent's investments. He could then be sued for the total amount of the profits. The *actio tributoria* was appropriate when an agent, who was doing business with his *peculium* with the principal's consent, had gone bankrupt and his creditors wished to divide the remaining assets according to each creditor's claim. The principal could be prosecuted if he was

⁶ Broekaert (2012).

⁷ *Dig.* 2.13.9 pr.; 4.9.6.1; 9.4.10 pr.; 10.3.1.pr.; 10.3.19.2.; 10.3.25.pr.; 11.3.9 pr.; 12.2.13.5; 15.1.19.2; 15.1.47.2; 17.2.14 pr.; 17.2.31 pr.; 17.2.32 pr.; 17.2.38.1; 17.2.52.11; 39.2.32 pr.; 42.1.16 pr. For the *actio pro socio* in court, see *Cic. Quinct.* 13.6; *Rosc.Com.* 25; *Flac.* 43.

⁸ *Petr. Sat.* 38.

⁹ D'Arms (1981); Mouritsen (2001).

¹⁰ These actions have been discussed extensively by legal historians. See e.g. Kirschenbaum (1987); Aubert (1994); Wacke (1994); Földi (1996); De Ligt (1999); Chiusi (2007); and Gamauf (2009).

responsible for an unjust division of the assets. Finally, the *actio quod iussu* made the principal completely liable if he had explicitly authorized a third party to contract with his agent. The last two actions, the *actio exercitoria* and the *actio institoria*, did not distinguish between agents *alieni iuris* or *sui iuris*. When the principal had agreed to his agent doing business, he was always liable for the full amount, whether his agent was working in maritime trade (*exercitoria*) or a land-based business (*institoria*). Together, these six actions constituted an appropriate framework for highly sophisticated levels of agency and, at the same time, provided a range of recovery opportunities for businessmen making contracts with slaves, freedmen, and freeborn agents. Nonetheless, Roman law recognized that the activities of agents *sui iuris* were not only confined to the business enterprises covered by the *actio exercitoria* and *actio institoria*. Principals were constantly relying on freedmen, friends, and colleagues to manage a broad range of economic activities, such as manufacture, sales, purchases, financial services, accounting, and property management.¹¹ In legal sources, these agents *sui iuris* are called *mandatarii*, *procuratores*, and *negotiorum gestores*, depending on the specific right of representation bestowed upon them by the principal.¹² They could enter into contracts with third parties on their principal's behalf, but it is important to note that representation did not create obligations between the principal and the third party. In case of conflicts, the agent was liable in person to the full extent of the contract. For the enforcement of contracts third parties had concluded with the agent, they were obliged to sue the agent. However, the agent could find redress by starting an *actio mandati* or *actio negotiorum gestorum* against the principal.¹³ Only in the late second century AD, when Papinianus introduced the *actio ad exemplum institoriae*, could the principal be held directly liable for the contracts his agents *sui iuris* had entered into. Third parties now had the choice between taking legal action against the principal or his agent.¹⁴

Finally, a variety of *actiones* was available to regulate standard commercial and financial transactions. The *actio certae creditae pecuniae* could be initiated against debtors refusing to repay a loan.¹⁵ Lease and hire were regulated by the

¹¹ Verboven (2002: 265–74).

¹² Again, a vast literature is available on these levels of agency. See e.g. on mandate Watson (1961) and Murillo Villar (2007); on *procuratio* Behrends (1971); Schäfer (1998); Briguglio (2007); and Klinck (2007); and on agency in Roman law in general Düll (1950); Kaser (1974); Coppola Bisazza (2008); and Miceli (2008).

¹³ The details of the applicability of the various *actiones* and the remarkable absence of an *actio procurationis* fall beyond the scope of this chapter. Suffice it to say that a *procurator* could be given either a specific mandate (*procurator mandatarius*), in which case the *actio mandati* was available, or a more general right of representation (*procurator omnium rerum*), when the *actio negotiorum gestorum* could be used. See Verboven (2002: 227–37) for a short introduction to one of the most complex problems in Roman law.

¹⁴ Kirschenbaum (1987: 142–3); Aubert (1994: 91–5); Miceli (2008: 338–62).

¹⁵ Gaius *Inst.* 4.13.5.

actio locati, available to parties leasing out objects or providing services, and the *actio conducti*, available to parties hiring another's objects or services.¹⁶ In the same way, sales and purchases were covered by the *actio venditi*, granted against the buyer for failing to pay the price, and the *actio empti*, by which a seller who did not fulfil his obligations could be sued. The buyer had two additional actions against the seller, in case any non-apparent defects of the merchandise had not been communicated. With the *actio redhibitoria*, he was allowed to demand rescission of the sale.¹⁷ On the other hand, if the buyer wished to keep the merchandise, he could sue the vendor for the damage, namely the lesser value of the object, with the *actio quanti minoris*.¹⁸ Finally, in case of fraud of any kind, restitution of damages could always be enforced by the *actio doli*, when no specific and more appropriate action was available.¹⁹

With all these *actiones* covering most aspects of conflicts in commercial and financial transactions and offering compensation in case of non-compliance, Roman law indeed seems like an effective operational tool to protect all parties involved against fraud and mismanagement and to stimulate exchange.

The Problem of Enforcement and Partiality

Nonetheless, despite the assumption that litigation was open to all and contained no inequality in rights, the Roman legal system proved to be less efficient than often assumed, because it lacked power of enforcement. Magistrates could rely on an auxiliary staff for basic administration and accounting, but usually had to manage without specialized personnel to enforce decisions. No police or military force would assist courts and plaintiffs to make the defendant fulfil his obligations.²⁰ This feature of Roman law complicated litigation in two ways.

First, if a defendant did not respond to the summons (*in ius vocatio*) or ignored the agreement (*vadimonium*) to be present in court on a certain day and thus refused to appear before the judge, no action could be started. With the courts refusing to compel the defendant to be present, a plaintiff may find it difficult to even initiate litigation.²¹ It is true that the plaintiff was allowed to use physical force to bring his opponent before the magistrate, but the permission of self-help was no valuable alternative to enforcement

¹⁶ *Dig.* 19.2: in particular 19.2.35.1.

¹⁷ *Dig.* 21.1.23; 21.1.31; 21.1.43.

¹⁸ *Dig.* 18.1.6.1; 19.1.13.1; 21.1.31.5; 21.1.38.13; 21.1.47 pr.; 21.1.61 pr.

¹⁹ *Dig.* 4.3. *Cic. Nat. Deor.* 3.30 calls this *actio* a 'dragnet of every kind of roguery', because of its wide applicability.

²⁰ Kelly (1966); Garnsey (1970).

²¹ There is no evidence that a praetor ever used his *lictores* and other subordinates for enforcement in private litigation.

by the state.²² If the defendant was physically stronger than the plaintiff, had recruited friends and family to protect him, or enjoyed a higher social status, the plaintiff may successfully have been prevented from bringing the defendant to court.²³ The one thing the weaker plaintiff could hope for was that a recalcitrant defendant feared to face loss of reputation and standing in the community and therefore agreed to be present in court.²⁴ Admittedly, one may argue that, during the empire, inferior plaintiffs were better protected by a new sanction: a defendant assembling a crowd to avoid being summoned to court committed a crime punishable under the *Lex Iulia de vi privata*.²⁵ Yet it seems doubtful that the possibility of initiating a new action against the defendant, when the first one had already proven to be unsuccessful, would be of any help. In the end, the plaintiff was forced to rely on self-help.

Secondly, even when a plaintiff had been successful in court, he continued to be his own enforcer, for no police force would assist in the execution of the judgement. Again, authorized self-help and the use of violence against the defendant would be the most straightforward solution.²⁶ The only limitation imposed on the plaintiff was that he was not allowed to rob the defendant of more than the initial claim or to inflict excessive damage upon his property.²⁷ Still, it was not until the reign of Marcus Aurelius that Roman law began to further restrict this private enforcement mechanism. Creditors were now obliged to take legal action a second time, before entering upon the debtor's property and seeking compensation.²⁸ However, a physically or socially inferior plaintiff could be presented with the same difficulties in finding redress as in bringing his opponent to court. Manipulating public opinion and the threat of infamy may again have been the only recourses open to a frustrated plaintiff.²⁹ Even though Roman law forbade any act that would render someone infamous, such as the composition of invective poetry and songs or publicly insulting an opponent, the fact that an explicit ban had been promulgated is sufficient proof that people often resorted to such techniques.³⁰

Apart from the difficulty of enforcement, itinerant businessmen must often have faced yet another problem. As they were frequently doing business in foreign markets where few people would be acquainted with them, they may have recoiled from litigation because they feared corrupt judges would favour

²² Self-help in summons had already been authorized by the Twelve Tables (*Lex XII Tab.* 1.1–2) and continues to be a standard procedure in initiating litigation (Plaut. *Poen.* 790; Cic. *Cluent.* 21.59; Hor. *Sat.* 1.9.77).

²³ See Plaut. *Curc.* 620–7 and, in particular, Apul. *Ap.* 26, which states that the plaintiff had better seek protection when trying to bring a murderer before a judge. For self-help in litigation, see Kelly (1966: 6–11).

²⁴ Garnsey (1970: 189–91).

²⁵ *Dig.* 48.7.4. Kelly (1966: 11–12).

²⁶ *Lex XII Tab.* 3; Gaius *Inst.* 4.21. Kelly (1966: 12–14).

²⁷ Sen. *Ben.* 6.4.4–6.4.5.

²⁸ *Dig.* 48.7.7. See also *Dig.* 4.2.13; 13.7.30; Bürge (1980).

²⁹ Kelly (1966: 22–9).

³⁰ *Dig.* 47.10.15.27. Usener (1901).

locals. This idea had already been articulated by the Carthaginian Hanno in Plautus' play *Poenulus*; he contemplated the difficulties of being engaged in litigation in a strange city (*si volo hunc ulcisci, litis sequar in alieno oppido*).³¹ It seems corruption and partiality of local courts had become a stock theme in Roman comedy, for Terence also alludes several times to the troubles strangers faced in obtaining redress in foreign cities.³² Favouritism continued to be a problem during the empire, as is aptly illustrated in a famous episode in Petronius' *Satyricon*.³³ Ascyrtos and Encolpius had lost a cloak with some gold coins hidden in it. When recognizing the garment in the hands of a farmer, Encolpius suggests to threaten him with a court case but Ascyrtos wryly rejects the idea: 'Who knows us around here? Who will believe anything we say?' Corruption in local Roman courts must frequently have complicated the settlement of disputes between local and foreign merchants.

In conclusion, while Roman law theoretically provided ample opportunity to find compensation in court for a wide variety of commercial conflicts, in actual practice the absence of state enforcement and risk of partiality seriously hampered litigation. Physical force and the value attached to one's reputation proved to be more important than equality of law. From this point of view, Plautus was certainly right when he had one of his characters declare that going to court was 'a frightful thing to do' (*metuculosa res*).³⁴ It is against this background that the following sections will analyse how Roman businessmen tried to solve this problem and how they hoped to find compensation in commercial conflicts.

JUDGES AND COLLEAGUES: BUSINESS CONFLICTS IN THE ARCHIVE OF THE SULPICII

To evaluate the practical importance of Roman law and the problem of enforcement in settling commercial disputes, we will focus on the famous archive of the Sulpicii, a family of moneylenders firmly rooted in the financial and commercial business at Puteoli during the first half of the first century AD. The archive, found at Murecine, half a kilometre south of the Porta Stabiae at Pompeii, contains more than a hundred tablets, concerning a wide variety of business activities, including the pursuit of claims on behalf of the family or

³¹ Plaut. *Poen.* 1403. ³² Ter. *And.* 810–12; *Eun.* 759–60.

³³ Petr. *Sat.* 12–15. Terpstra (2008: 364–5) unjustly downplays the importance of this text and questions the authority of Ascyrtos' opinion, arguing he was no doubt exaggerating. The fact that merchants sought and found alternative ways of enforcement, discussed in the next section, confirms Ascyrtos' doubts about the efficiency of Roman courts.

³⁴ Plaut. *Most.* 1101.

their clients. It has often been argued that these tablets present the best example of 'Roman law in action', a claim which, with the aforementioned shortcomings of the legal system in mind, may sound surprising.³⁵ To assess its validity and the frequency with which the Sulpicii had their disputes settled in court, we will briefly discuss the ways in which the Sulpicii and their clients tried to resolve conflicts. We start with amicable conflict resolution and extra-legal means of enforcement and end with actual court cases.³⁶

Avoiding and Ending Litigation

We first have to bear in mind that the archive only shows us a very limited part of conflict resolution. Many disputes will have been settled out of court, without the need to register the proceedings and outcome.³⁷ The mere threat of slow litigation may indeed have sufficed to force both parties to reach an agreement. This seems to be implied in Ulpianus' description of the *editio actionis*, or notice of action. He clearly states that anyone who intended to bring a case before the magistrate is obliged to indicate the action to the defendant, not only because the latter will then be better prepared to defend his case, but, more importantly, to offer him the choice of whether or not to defend himself and start litigation.³⁸ Estimating the frequency of amicable settlements to avoid a lawsuit is obviously impossible, but comparative evidence of conflict resolution in other business communities show that merchants always tried to avoid litigation when private settlements were possible.³⁹ It seems very likely that Puteolan entrepreneurs did not differ in this respect.

Nevertheless, the archive does show us that even when the parties had initiated litigation they continued to try and settle the conflict out of court, presumably to hasten the outcome. Three tablets witness an ongoing conflict between Sulpicius Faustus and L. Faenius Eumenes. The first two documents are *vadimonia*, in which both parties agreed to appear before a magistrate and start a court case.⁴⁰ Apparently, previous negotiating had not given the intended result. The third document, on the other hand, states that Faustus

³⁵ Gardner (1999: 11); Rowe (2005).

³⁶ To identify the exact moment in Roman litigation when an act stops being extra-judicial and becomes judicial is not as straightforward as in current legal practice. Nevertheless, the archive of the Sulpicii provides sufficient clues to separate extra-judicial from judicial acts. For these problems, see Metzger (2007). For an analysis of the content of the disputes, see Jones (2006: 144–61).

³⁷ For conflict resolution by informal agreement in the Greek world, see Steinwenter (1971: 117–40). As shown by Gagos and Van Minnen (1994: 30), papyri from late antique Egypt indicate that the terms of the settlement were often recorded in a notarial deed, but any comparable data are lacking for the western Mediterranean.

³⁸ Dig. 2.13.1 pr.

³⁹ Clay (1997b); Gelderblom (2011).

⁴⁰ *TPSulp.* 2–3.

and Eumenes had eventually reached an agreement and wished to end the conflict (*finiendae controversiae causa*) and the court case.⁴¹ However, in the meantime, both parties had sent representatives (*cognitores*) to Rome to start a lawsuit before the praetor, so the *vadimonium* these people had agreed upon needed to be withdrawn. Eumenes therefore agreed to indemnify Faustus' *cognitor* in case he did not turn up or failed to fulfil the obligations established in the *vadimonium*.

Voluntary Oaths

Next, a few tablets illustrate that the Sulpicii wished to avoid immediate litigation by adding extra-judicial enforcement mechanisms to documents in which disputes were being negotiated. They often asked their opponents to provide additional security to an agreement by including voluntary and extra-judicial oaths (*iusiuranda voluntaria*). This seems to have been a quite regular practice, for Roman law considered these oaths as a means to dispose of actual litigation and resolve the conflict.⁴² For instance, in one of the tablets, Cinnamus grants a loan of 30,000 sesterces. He has the debtor make a binding promise to repay the money, stipulates a fine in case of delay, and demands an oath by Jupiter and the *numen divi Augusti*.⁴³ Another tablet allows us to follow the history of a loan of 13,000 sesterces, issued in AD 38 by Hesychus to the grain merchant C. Novius Eunus.⁴⁴ One year later, Eunus still owed Hesychus more than 1,000 sesterces. Hesychus obviously wished to have the debt settled, but instead of taking his debtor to court immediately, Hesychus stipulated that if Eunus failed to repay, the debt would be increased each day by an extremely high level of interest. Moreover, he asked Eunus to swear an oath by Jupiter, the *numen divi Augusti*, and the emperor's *genius*, that he would redeem the loan on the date they had agreed on. Finally, two tablets show Sulpicius Cinnamus taking an oath, again by Jupiter, the *numen divi Augusti*, and the emperor's *genius*, to end a conflict with a certain Iulius Fortunatus. The parties had already drafted a *vadimonium* and agreed to appear in court, but it seems that, at the last moment, Fortunatus offered Cinnamus the opportunity to settle the dispute by mutual agreement and prevent a court case.⁴⁵

⁴¹ *TPSulp.* 27. See Wolf (1985).

⁴² *Dig.* 12.2.1. These oaths are opposed to oaths sworn during a judicial trial (*iusiuranda in iure*). For extra-judicial oaths in Roman law, see *Dig.* 12.2.17 and 12.2.28.10.

⁴³ *TPSulp.* 63.

⁴⁴ *TPSulp.* 68.

⁴⁵ *TPSulp.* 28–9. Camodeca (1999: 93–6) initially assumed these documents to be *iusiuranda in iure*, but Humbert (2000) rightly identified them as *iusiuranda voluntaria*. Camodeca (2000: 183–4) subsequently sided with Humbert. Contra, however, Metzger (2007), who again argues that the oaths were *iusiuranda in iure*.

In all these documents, the additional oaths did not make the contracts any more binding. Taking an oath made a person liable for perjury, but usually did not give rise to secular punishment. As oaths by a divine power were firmly embedded in religious practice, punishment was usually left to the gods. As Tacitus aptly remarked: perjury is the concern of the gods alone.⁴⁶ Breaking oaths taken by the emperor, on the other hand, could result in a *crimen maiestatis*, which, according to Ulpianus, could be punished by public flogging, but again did little to enforce the initial agreement.⁴⁷ Nevertheless, oaths had considerable power of enforcement, as they were taken in public and probably in the forum. As many people would probably have witnessed the oath, perjury would damage a businessman's reputation by informing others that not even a promise to the gods and the power of Rome would deter him from shirking obligations. The combination of fear of divine justice on the one hand and the threat of public humiliation and ostracism on the other, or as Cicero puts it, *poena divina, humana dedecus*, thus provided an additional guarantee and may have prevented debtors from breaking the contract.⁴⁸

Private Arbitration

The Sulpicii and their clients also relied on private arbitration to end conflicts.⁴⁹ Six documents mention a procedure in which an *arbiter ex compromisso* will decide the dispute between Cinnamus and C. Iulius Prudens.⁵⁰ This is again an extra-judicial arrangement, in which both parties voluntarily and by mutual agreement appoint an arbiter, who would hear the case and whose decision would be binding. Usually, both parties drafted a *compromissum* in which they outlined the arbiter's duties and stipulated appropriate penalties in case one of them disregarded the final decision. If one of the parties ignored the settlement, he could be sued according to the terms of the *compromissum*.⁵¹ For the purpose of this chapter, two points are of interest: the arbiter's identity and the place of arbitration.

All six documents mention one and the same arbiter, M. Barbatius Epaphroditus, perhaps because all the tablets may have belonged to the same dossier.⁵² Nothing in particular is known about Epaphroditus, but it seems the Sulpicii and their opponents put great trust in him. As most conflicts in the

⁴⁶ Tac. *Ann.* 1.73.4.

⁴⁷ Dig. 12.2.13.6.

⁴⁸ Cic. *Leg.* 2.9.22.

⁴⁹ For a general introduction to dispute settlement by an arbiter in antiquity, see Steinwenter (1971: 91–117) for the Greek world and Ziegler (1971) for the Roman Empire. Both, however, almost exclusively focus on the legal aspects of private arbitration.

⁵⁰ *TPSulp.* 34–9.

⁵¹ Gagos and Van Minnen (1994: 32); Camodeca (1999: 103). See also Dig. 3.2.13.5; 4.8; and 44.7.23 pr.

⁵² See Sbordone (1984) for these tablets.

archive no doubt involved business deals, it seems likely that both parties will have preferred to present the case to a trustworthy and objective arbiter who had at least some experience in business contracts. Perhaps Epaphroditus was a respected member of the local business community in Puteoli. He was clearly a former slave, and as a considerable part of Roman commerce was managed by freedmen, he may have acted as a business agent for the family of the MM. Barbatii. This hypothesis can perhaps be corroborated by the fact that, in the first half of the first century BC, another freedman of the same family had been engaged in the oil trade.⁵³ Moreover, in another tablet, a certain M. Barbatius Celer, who may have been related to Epaphroditus, stood surety for a shipper from Asia Minor and may have been engaged in business too.⁵⁴

It obviously made perfect sense to appoint as a judge a colleague who was acquainted with the intricacies of business for, theoretically, appointing colleagues as a judge could benefit businessmen in two ways. First, professional experience could help the arbiter to reach a fair decision and appropriate punishment. Due to the proliferation of laws and additional clauses until the codification by Justinian, judges in court may have been uncertain on the exact procedures and punishments connected to every single case discussed by Roman law.⁵⁵ First-hand experience may thus have guaranteed a more rational decision. The plaintiff in Demosthenes' speech *Against Aphobus* underlines this advantage of private arbitration right from the start: instead of allowing colleagues well acquainted with the details of the dispute to give a decision, the defendant had forced him to bring the case to court, where the judges had no accurate knowledge of the conflict.⁵⁶ Moreover, private arbitration allowed the opponents much more flexibility and negotiation than official litigation. The major advantage in appointing an arbiter was that he enjoyed wider discretionary powers in evaluating the evidence and judging the case than an official *iudex*, who was bound to follow traditional procedure. One document in particular seems to stress this flexibility.⁵⁷ The case had already been brought before the court and heard by a judge (*sub iudice*), when the opponents agreed to refer the dispute to a private arbiter after all. Apparently they argued that the arbiter would be better placed to judge their case or come to a verdict much quicker.⁵⁸ The absence of a predetermined punishment allowed the arbiter to estimate a fine in accordance with actual damages, but also account for less quantifiable and speculative losses, such as damage to one's reputation, missing out on trading opportunities, and so on. A business colleague would be best placed to assess this kind of damages and come to a fair punishment.

Secondly, the chances were also great that the arbiter was familiar with the plaintiff's and defendant's reputation or had encountered both parties in

⁵³ CIL 1.3003. See Panciera (1980: 236). ⁵⁴ *TPSulp.* 78.

⁵⁵ Morley (2007: 69–70). ⁵⁶ Dem. 27.1. ⁵⁷ *TPSulp.* 34.

⁵⁸ Cic. *Q. Rosc.* 4.13 already referred to this procedure.

previous business transactions. Inside knowledge of the local business world and the entrepreneurs' reputations could help the arbiter in judging the case. The arbiter had the right to consider preceding contracts and litigation, and the parties' reputation and standing in the local community. A good reputation may thus have influenced his final decision. This reputation mechanism could obviously only work when the arbiter was able to evaluate both parties' standing in local society. As will be argued in more detail in the section entitled 'The Power of Close-Knit Business Communities', repeated transactions in a single business community are crucial in order for a reputation mechanism to function. In this particular conflict, these conditions seem to have been met. Iulius Prudens was one of the Sulpicii's clients and hence a member of the Puteolan business community.⁵⁹ As previously argued, Epaphroditus probably belonged to a family with commercial interests in Puteoli. All parties involved may hence have been fairly well acquainted with each other, allowing the reputation mechanism to work. On the other hand, if only one of the parties knew the arbiter, his opponent might fear a partial judgement. A foreign merchant arriving in the city for the first time still had to prove his trustworthiness to the community, but was at the same time forced to evaluate the honesty of his trading partners. The risks of doing business in a community where a merchant was a complete stranger, without the support of a network to protect him, were rightly stressed by Cicero.⁶⁰ Such a person should therefore be very careful in agreeing on an arbiter suggested by his opponent. The risks of appointing a partial arbiter are illustrated in Plautus' play *Rudens*, in which the ownership of a wallet is being disputed. Both parties agree to end the conflict by private arbitration. One of them, Trachalio, who is obviously unfamiliar with the people residing in the neighbourhood, wishes to avoid favouritism and asks his opponent Gripus where exactly he lives. Gripus points to the horizon and answers 'as far off as the farthest fields'. Trachalio then proposes to have the case heard by the owner of a nearby cottage, not realizing that he was actually referring to Gripus' master. In the scene's final two lines, Gripus so often (no less than three times!) stresses that the judge is completely unknown to him that Trachalio should have become suspicious.⁶¹ This scene aptly shows that if an arbiter was not familiar with the two parties' background, the best thing to do was appoint someone who was completely unknown to both of them.

In conclusion, when an arbiter was acquainted with the actual and potential losses of commercial conflicts, because of his own involvement in business, and had the chance to assess the reputation of plaintiff and defendant, his decision may thus be more in line with real losses and could even reward

⁵⁹ See Camodeca (1999: 130) for Prudens as a client of the Sulpicii.

⁶⁰ Cic. *Verr.* 5.167.

⁶¹ Plaut. *Rud.* 1033–44. For conflict settlement in Roman comedy, see Scafuro (1997: 168–80).

good behaviour in previous business deals. These two features of private arbitration—the arbiter’s technical expertise and familiarity—were easily recognized as major assets in conflict resolution and can also be found in other Greco-Roman sources. For instance, in one of Terence’s comedies, two farmers try to end a boundary dispute by appointing a neighbour, who was evidently also a farmer, as arbiter.⁶² Egyptian papyri are very instructive too.⁶³ The importance of specialist knowledge is stressed in several documents, which show the preference of artisans and merchants for having a dispute settled by colleagues in the same trade.⁶⁴ The significance of familiarity on the other hand is aptly illustrated by a seventh-century AD papyrus, in which the judges from Arsinoë hear a dispute between two citizens living in the village Pelkeësis and instruct both parties to return to their village and have the conflict settled by three of their fellow citizens.⁶⁵ Private arbitration in other societies, from the Middle Ages until the nineteenth century, continued to be organized along these lines.⁶⁶

Next we turn to the location where the dispute would be settled. The tablets clearly show that the arbiter had the right to decide where and when he would hear the case. In most cases he ordered the parties to meet in the *chalcidicum Octavianum* and once in the *chalcidicum Hordionianum*, both colonnaded vestibules which formed the entrance to the interior of the *basilica* at Puteoli.⁶⁷ The staircases of these vestibules were frequently used by auctioneers to organize their sales, and the Sulpicii’s archive frequently mentions transactions concluded in the *chalcidicum Caesonianum*.⁶⁸ The locations chosen by Epaphroditus thus clearly belonged to the commercial topography of Puteoli. The *basilica* and its various sections would be crowded by entrepreneurs of all sorts. It is well known that, in Rome, and no doubt in other cities too, merchants, auctioneers, bankers, moneylenders, and other businessmen to some extent all frequented the same locations (including the *basilicae*), as the services they offered were mutually supportive.⁶⁹ Many colleagues of the Sulpicii and their opponents would therefore be present to witness the arbitration, which no doubt forced them to cooperate and settle the conflict. If one of the parties was acting unreasonably or refused any form of agreement, peer pressure of the local business community and the fear of reputational damage may have encouraged him to accept a settlement and, consequently, honour the decision of the arbiter. Unwillingness to cooperate could be punished by

⁶² Ter. *Heaut.* 498–502. See Gagliardi (2008).

⁶³ Modrzejewski (1952).

⁶⁴ BGU 1.315 (a fuller and merchant appoint a merchant); SB 1.5681 (two dyers appoint a dyer). See Gagos (2008).

⁶⁵ SB 22.15764. See Sirks and Worp (1994).

⁶⁶ Clay (1997a); Gelderblom (2011).

⁶⁷ The *chalcidicum Hordionianum* is mentioned in *TPSulp.* 36. For *chalcidica* as architectural parts of the *basilica*, see Vitruvius *Arch.* 5.1.4.

⁶⁸ *TPSulp.* 85, 87, and 90–2. For auctions organized in *chalcidica*, see Lintott (2002: 559) and García Morcillo (2005: 215–16).

⁶⁹ Andreau (1987).

public defamation (*flagitatio*).⁷⁰ Plautus, for instance, frequently describes how untrustworthy people could be subjected to loud derogatory comments in the forum (obviously the public place par excellence).⁷¹ Debtors in particular feared public slander by their creditors. In Rome, the names of debtors were displayed in public at the *columna maenia*.⁷² Plautus describes how a banker, in public and in a loud voice, started demanding the interest he was owed.⁷³ Petronius may refer to the same public act of disgrace when he has one of Trimalchio's guests proudly declare that, in the forum, no one ever had to remind him to pay his debts.⁷⁴ Creditors even went to the debtor's house to publicly declare the amount of his debts and reclaim the money.⁷⁵ We can easily imagine similar scenes happening in the *basilica*, the harbour, and other parts of Puteoli's commercial geography. In conclusion, by hearing the case at a location where many colleagues of the Sulpicii, Iulius Prudens, and himself would be present, Epaphroditus gives additional power to the reputation mechanism as means of enforcement.

Despite its obvious advantages, the frequency of private arbitration in Puteoli is difficult to estimate, for often there was no need to record the procedure and the arbiter's judgement. Nevertheless, comparative evidence from antiquity and pre-industrial societies suggests that merchants always preferred this kind of conflict resolution over time-consuming lawsuits. The opening of one of Demosthenes' speeches makes this point very clear: only because the defendant had refused to submit the conflict to private arbitration had the plaintiff decided to start a lawsuit.⁷⁶ In fifteenth-century Bruges, arbiters decided over three-quarters of the disputes involving Spanish merchants, and courts even encouraged businessmen to take recourse to private arbitration.⁷⁷ Furthermore, Sephardic merchants admonished their heirs in their will to avoid litigation and use private arbitration whenever possible.⁷⁸ As there is no reason why the Puteolan businessmen would have favoured an official court case over private arbitration, we can assume that the Sulpicii took recourse to this way of conflict settlement far more often than the archive suggests.

Extra-Judicial *Vadimonia*, the Final Resort before Entering the Courtroom?

The archive also contains a series of tablets asserting the initiation of a court case. These documents include voluntary, extra-judicial agreements to appear

⁷⁰ Usener (1901).

⁷¹ Plaut. *Pseud.* 1145. Cf. *Pseud.* 556; *Curc.* 683; *Epid.* 118; *Men.* pr. 48; *Truc.* 759.

⁷² Cic. *Sest.* 18. ⁷³ Plaut. *Most.* 585–607. ⁷⁴ Petr. *Sat.* 57.

⁷⁵ Plaut. *Aulul.* 446; *Most.* 768; *Pers.* 569. ⁷⁶ Dem. 27.1.

⁷⁷ Gelderblom (2011). ⁷⁸ Trivellato (2009).

in court (*vadimonia*) and tablets registering either the fulfilment or breach of the agreements' conditions (*testationes sistendi*).⁷⁹ Both deeds certainly show that the Sulpicii did not hesitate to bring opponents to court to end a conflict. Nevertheless, it is striking that not a single document actually obliges plaintiff and defendant to meet right on the spot where the magistrate would hear the cases.⁸⁰ They always chose meaningful architectural landmarks on or close to the forum, instead of simply agreeing to meet on the forum, where the magistrate's office was located. In cases to be heard in Puteoli, the encounter would take place near one of the altars of Augustus, built by the leading families of the city.⁸¹ In Capua, the parties would meet in the *basilica*.⁸² In Rome, famous statues of illustrious Roman heroes or the altar of Mars Ultor served as meeting points.⁸³

To evaluate the exact purpose of these landmarks, it is important to note that the decision to write a *vadimonium* still left open the possibility of settling the conflict without actually taking the next step and going to the magistrate. Therefore, the choice of meeting points may not be fortuitous. If the opponents still hoped to end the disagreement out of court, they may have opted for meeting points with symbolic power to enforce possible agreements. The choice of meeting before an altar of Augustus or Mars Ultor for instance may have been inspired by the wish to conclude the agreement with a public oath, sworn on the emperor's or the god's statue. Organizing a final discussion in the *basilica*, on the other hand, had the double advantage that the magistrate may have heard his cases in this building, but also that business colleagues would be present to witness the encounter. As we noted in connection with the *chalcidica*, a meeting in the *basilica* presented the parties with witnesses who, as members of the same business community, facilitated conflict resolution and enforcement. Finally, we should perhaps not underestimate the emblematic power embodied in a statue of the emperor, a famous Roman hero, or a god. Making an agreement in front of monuments symbolizing the political supremacy of Rome or divine power may endorse the accord

⁷⁹ *Vadimonia*: *TPSulp.* 1–15. *Testationes sistendi*: *TPSulp.* 16–21. According to Camodeca (1999: 49–53), all these documents are extra-judicial *vadimonia* or meetings before the official trial was commenced, to bring the defendant before the magistrate ('*Ladungsvadimonia*'). Metzger (2000: 160–74; restated in Metzger 2007), on the other hand, has argued that at least some of the *vadimonia* (*TPSulp.* 1bis, 3 and 4) must have been judicial documents, with which the lawsuit was postponed and the defendant promised to appear in court again ('*Vertragungsvadimonia*'). Yet Camodeca (2000: 182) rightly stresses that, in this case, the absence of any reference to a magistrate before whom the two parties would meet again, is quite remarkable. For *vadimonia* in literary sources, see Cic. *Quinct.* 6.25 and Hor. *Sat.* 1.9.35.

⁸⁰ Cloud (2002).

⁸¹ *Ante aram Augusti Hordionianam*: *TPSulp.* 1–10 and 16–17. *Ante aram Augusti Suettianam*: *TPSulp.* 18. Unclear is *TPSulp.* 11, where the text after *ante aram Augusti* is illegible.

⁸² *TPSulp.* 12.

⁸³ *Ante statuam Cn. Senti Saturnini triumphalem*: *TPSulp.* 13–14. *Ante statuam Gracci ad columnam quartam proxume gradus*: *TPSulp.* 19. *Ante aram Martis Ultoris*: *TPSulp.* 15.

with religious sanction. In this perspective, the choice of Mars Ultor as the ultimate avenging power may very well be indicative. Perhaps not coincidentally, a *vadimonium* from Herculaneum also selected the Temple of Mars Ultor in Rome as a meeting point.⁸⁴

It thus seems that the choice of landmarks reflected the parties' wish to end the dispute out of court by a final negotiation. As with private arbitration and the inclusion of extra-judicial ways of enforcement, the outcome could again be witnessed by colleagues and sanctioned by public, voluntary oaths. On the other hand, all landmarks were fairly close to where the court magistrate could be found, so if private negotiations collapsed, the plaintiff still had the opportunity to proceed immediately with the action in court.

Litigation and Appointing a Judge

Finally, several tablets show that, if private settlement and arbitration had failed, the Sulpicii and their opponents decided to settle the dispute in court. To understand the procedure they followed, a short description of litigation is necessary. A civil lawsuit consisted of two separate stages. The case was first heard by a magistrate, in order to agree on the exact formula and appoint a judge or *iudex* acceptable to both parties, and next referred to the judge, who would evaluate the evidence and come to a verdict. In private lawsuits, judges were chosen from a list (*album iudicum*), issued by the local *duoviri*. As the relevant chapters in the *Lex Irnitana* indicate, judges were chosen either among the members of the city council, or among the freeborn citizens who owned a property of no less than 5,000 sesterces.⁸⁵ If, however, the parties could not agree which *iudex* would decide on their case, they had the right to appoint, in mutual concord, someone whose name was not displayed on the list but whose verdict would be equally binding.⁸⁶ Judges usually had no special qualifications, which implied that, in order to understand and assess the specific details of each case, all parties had to supply as much information as possible. Especially in lawsuits in which details of business contracts would be discussed, informing a judge who had no first-hand experience in commerce might have been a demanding and, above all, time-consuming task. As businessmen in particular benefit from quick litigation, the usual procedure may seem cumbersome and inefficient. However, the close reading of tablets in which *iudices* were appointed shows that the Sulpicii and their opponents appear to have found a solution.

In the first tablet, presumably a draft prepared in advance of the process, Sulpicius Faustus and the defendant, A. Castricius Celer, suggest that a certain

⁸⁴ TH 15.

⁸⁵ *Lex Irnitana* 86.

⁸⁶ *Lex Irnitana* 87. See Terpstra (2013: 46–7).

A. Titinius Anthus maior will be appointed judge.⁸⁷ Given his *cognomen*, Anthus was obviously a freedman and clearly did not feature on the official *album iudicum*. Why the two parties wished to present the dispute to Anthus is not explained in the tablet, but an educated guess can be made by mapping out the activities of other members of the AA. Titinii in the Bay of Naples. Inscriptions reveal that this family was firmly rooted in the society of Puteoli, but we lack any information on the members' professions.⁸⁸ In Pompeii, on the other hand, only two AA. Titinii are attested, but the nature of the inscriptions is highly instructive. The name A. Titinius Princeps is scratched four times on the wall of the *basilica*.⁸⁹ These scribblings firmly locate Princeps in a commercial setting and may suggest he was doing business in Pompeii. This assumption is substantiated by two *tituli picti* on Baetican *amphorae*, also discovered in Pompeii and identifying an A. Titinius Herculaneus as a fish-sauce merchant.⁹⁰ It thus seems reasonable to connect A. Titinius Anthus maior to the Pompeian entrepreneurs and assume that Anthus himself was somehow engaged in business. Perhaps we can trace the commercial interests of this family even further. Around the middle of the first century BC, an A. Titinius features among the victors at the Amphiararaia and Rhomaia in the Boeotian city of Oropos.⁹¹ He may have been one of numerous Italian *negotiatores* doing business in the Greek east. At any rate, with several members of the AA. Titinii belonging to the business communities in Pompeii and Puteoli, we can understand why Sulpicius Faustus and Castricius Celer wished to have their dispute settled by Anthus. He possessed relevant experience to evaluate the commercial details of the conflict and presumably was familiar with both plaintiff and defendant.

A second tablet informs us that a dispute between Sulpicius Cinnamus and C. Varius Cartus would be heard by the *iudex* L. Cocceius Anthus.⁹² Apparently, the Sulpicii decided once more to have the conflict judged by a freedman and, yet again, it seems that Anthus belonged to a Campanian family with commercial interests.⁹³ During the first century BC, an L. Cocceius Piso was curator of an association of oil merchants.⁹⁴ Even though the stone was found in Aegina, it has been suggested that the inscription was originally located in Delos, where several *corpora* of oil merchants were active.⁹⁵ A Cocceius also features on a very fragmentary inscription from Corinth.⁹⁶ Finally, in a *vadimonium* from the Sulpicii archive, a Cocceius Epaphroditus is mentioned

⁸⁷ *TPSulp.* 22. ⁸⁸ *CIL* 10.3014–3016; *EE* 8.1.419; *AE* 1974, 259.

⁸⁹ *CIL* 4.1807; 4.1867; 4.1932; and 4.1945.

⁹⁰ *CIL* 4.9373 and 4.9379. See Cébeillac-Gervasoni (2000: 110).

⁹¹ *IG* 7.416. ⁹² *TPSulp.* 32.

⁹³ The *gens* Cocceia has left numerous inscriptions in all major cities of Campania. For Cocceii in Puteoli, see *NSA* 1913, 25; *CIL* 10.1614; 10.1764; and 10.2308–11.

⁹⁴ *ILGR* 28 = *AE* 1977, 782.

⁹⁵ For the oil trade in Delos, see Delorme (1951).

⁹⁶ *Corinth* 8.3.119.

as witness.⁹⁷ Was he a business acquaintance of the Sulpicii and hence asked to sign the document?

In another tablet, which probably describes an *actio certae creditae pecuniae* by which Sulpicius Cinnamus tried to reclaim 18,000 sesterces, the *iudex* was C. Blossius Celadus.⁹⁸ Again, nothing else is known about this person, but like the Titinii and Cocceii, he belonged to a local Campanian family. The Blossii were clearly part of the Puteolan aristocracy: already in 105 BC, a C. Blossius held the office of *decurio* and another C. Blossius was *duovir* in AD 113.⁹⁹ More important, however, is the fact that, as in the previous case study, a certain C. Blossius Venerianus features as a witness in another document from the archive of the Sulpicii.¹⁰⁰ It seems very likely that both Blossii were somehow related. Yet for neither of them can we prove beyond doubt that they were engaged in business. The Sulpicii's preference for businessmen to judge their disputes in private and official litigation, however, suggests that Celadus was a member of the local community of entrepreneurs. Venerianus may have been a colleague in trade too, asked to witness the document because of previous contacts.

The final document which mentions an *iudex* is quite peculiar.¹⁰¹ The text declares that Sulpicius Cinnamus and Q. Laberius Philippus were involved in a court case, which would be judged by Q. Laberius Cerdo maior. Two things should be noted. First, the chances are real that Philippus and Cerdo belonged to one and the same family. Why would Cinnamus agree to appoint a judge who was most likely related to his opponent? Secondly, in contrast to the three *iudices* previously mentioned, Cerdo did not belong to a local family originating from the area around the Bay of Naples. QQ. Laberii rarely occur in monumental epigraphy, and never in Puteolian inscriptions, but they do frequently appear as merchants in *tituli picti* on Spanish oil *amphorae* dating to the middle of the second century AD.¹⁰² During the first century BC and the first decades of the imperial period, QQ. Laberii were also present on Delos and in Asia Minor, where they may have been engaged in commerce as

⁹⁷ *TPSulp.* 21.

⁹⁸ *TPSulp.* 31.

⁹⁹ *CIL* 10.1781 and *AE* 1974, 256. Other Blossii in Puteoli: Blossia Tertia (*AE* 1983, 198). Blossii are also frequently attested in other Campanian cities, such as Cumae (*AE* 1980, 242; *CIL* 1.3129), Capua (*CIL* 10.3772; 10.3785; 10.4045), and Herculaneum (*CIL* 10.1403). See also Liv. 23.7.8–9; 27.3.4–5; Cic. *Leg. Agr.* 2.34.93 for the Campanian origin of the Blossii.

¹⁰⁰ *TPSulp.* 118.

¹⁰¹ *TPSulp.* 33.

¹⁰² *Tituli picti* document the activities of several QQ. Laberii working together in a *societas* (*CIL* 15.3924); a Q. Laberius [—] (Blázquez Martínez and Remesal Rodríguez [2003: nr. 83]); Q. Laberius Apo[—] (Rodríguez Almeida [1972: nr. 20]); Q. Laberius Callistus (Rodríguez Almeida [1972: nr. 20]); Q. Laberius Dioga (*CIL* 15.3916a–c and Rodríguez Almeida [1972: nr. 20]); Q. Laberius Eutychus (*CIL* 15.3917–23a–e and Rodríguez Almeida [1979: nr. 57]); Q. Laberius P. [—] (*CIL* 15.3915); Q. Laberius Protogenes (Blázquez Martínez and Remesal Rodríguez [2003: nr. 83]); and Q. Laberius Zosimus (*CIL* 15.3916a–c and 3917–23a–e; Rodríguez Almeida [1972: nr. 20; 1979: nr. 57]; Blázquez Martínez, and Remesal Rodríguez [2003: nr. 81–2]).

Italian *negotiatores*.¹⁰³ Philippus and Cerdo may hence be the first-century representatives of a family with long-lasting commercial interests. Despite their non-local origin, the QQ. Laberii must have been well-respected members of the Puteolan business community, for the Sulpicii apparently were confident that Cerdo would come to a fair decision. We can perhaps imagine that Cerdo enjoyed a reputation of honesty and trustworthiness in Puteoli and that Philippus, who was obviously a freedman, was acting as Cerdo's agent. When Cinnamus and Philippus failed to settle their dispute out of court, Cinnamus may have suggested bringing the case before a trusted colleague who was also familiar with the business of his opponent. Only if Cerdo himself was a frequent visitor to the Puteolan business scene, subject to peer control in a community of colleagues, would he be able to guarantee impartiality and a fair hearing to Cinnamus.

We can thus safely conclude that the choice of an official *iudex* resembled, in every single detail, the appointment an arbiter in private litigation. Although from a legal point of view completely different, both procedures were organized along the same lines, because conflict settlement among merchants benefited most from appointing judges who had business experience relevant to the case and were able to take into account the reputational background of both parties.

THE POWER OF CLOSE-KNIT BUSINESS COMMUNITIES

The Sulpicii archive clearly suggests that the procedures of Roman law alone did not provide businessmen with efficient tools to resolve conflicts. Various aspects of formal litigation proved to be very inefficient. Due to the slow progress of lawsuits, merchants tied up in litigation might miss out on interesting business opportunities and, in Puteoli as well as today, time was money. Moreover, taking a dispute to court required them to reveal details about some of their transactions, which endangered the secrecy of business. Taking legal action against a colleague may also harm a merchant's reputation, for few entrepreneurs would want to deal with a litigious partner. Cicero articulated the idea that a businessman's most priceless asset was his reputation, which should not be harmed in litigation. It is only reasonable, he argued, to yield some of one's own right, to prevent court cases as far as one's interests will permit, and, he rightly adds, perhaps even a little farther. Businessmen may even benefit from refraining from enforcing one's rightful claims and

¹⁰³ Delos: ID 2622. Asia Minor: IEph 20; ISmyrna 589 = SEG 33.986.

cultivating precious relationships.¹⁰⁴ Next, a corrupt judge could deny a plaintiff his rightful compensation. Finally, and most importantly, the lack of a police force to bring defendants to court compelled plaintiffs to rely on self-help, but apart from the problem of facing a more powerful opponent, businessmen had to reckon with yet another risk. Defendants may have wished to avoid litigation simply by leaving the city never to come back. Especially for businessmen like the Sulpicii, who were often dealing with merchants constantly travelling around, the risk that the defendant may disappear from Puteoli should not be underestimated. The absence of state-sanctioned enforcement after the judge had given his verdict posed a similar problem. A successful plaintiff may end up with the right to reclaim his money or impose a fine on the defendant, but what if his opponent simply decided to sail away?

To solve these problems, the Sulpicii and the business community in Puteoli, and no doubt in other cities as well, relied on private-order institutions, by which enforcement costs were transferred from a non-existing policing force to the members of the community, and colleagues in commerce enforced agreements and verdicts to end disputes. How this mechanism worked is clearly illustrated in the tablets. Every single stage of conflict resolution which could be organized out of court (oaths, last-minute discussions, private arbitration) took place in those parts of the city where many fellow businessmen would be present. Moreover, every time when someone was asked to decide on a conflict, the Sulpicii and their opponents made sure that the arbiter or *iudex* was somehow connected to business himself. We stressed in the section on private arbitration that having a case heard by a judge with relevant experience offered many advantages. He would understand the importance of quick decision-making, rely on his own practical knowledge and maybe previous encounters with both parties, and finally sentence the defendant to an appropriate punishment. Businessmen, however, benefited in yet another way from this particular kind of conflict resolution. Disputes are settled in public in the presence of colleagues, so we can assume that at least part of the community was aware of the conflict and the decision by the judge. If the defendant bluntly ignored the verdict and denied the plaintiff compensation, his standing in the community would seriously be damaged as this behaviour would earn him a reputation as an untrustworthy business partner. Moreover, this system may also have reduced the risk of having a case decided on by a partial judge. Even though corruption could evidently not be completely eradicated, the fact that the judge, whether acting as an arbiter or a *iudex*, was chosen by plaintiff and defendant at least suggests both parties expected him to give a fair judgement.

¹⁰⁴ Cic. *Off.* 2.64. Cf. also Nepos *Att.* 6.3.

Similar reputational mechanisms to settle disputes among businessmen have been traced in other societies, in which the costs of going to trial were high and the government offered no efficient tools of enforcement.¹⁰⁵ Analysis of conflict resolution in these communities has shown that enforcement is usually organized by a system of punishment under multilateral interaction. This implies that if a cheater refused to accept a verdict, he would be punished by all members of the community, even though his fraudulent behaviour had only damaged a single member. Attempted escape from punishment would thus result in ostracism, foreclosure of future cooperation, public denouncement, and high costs to re-enter the community and gradually rebuild trust. Past behaviour, punishment, and future interaction are thus linked by a reputation mechanism.

Nevertheless, this system can only work under certain conditions. First, the cheater must expect to continue doing business with members of the community. If he planned to trade only once in Puteoli and never come back, group punishment obviously would not harm him. Only repetition of transactions tends to have a self-disciplining role.¹⁰⁶ However, as the Sulpicii were providing financial services in one of the main commercial hubs in Italy and even the Mediterranean, one may doubt whether many merchants would deliberately end trading relationships and miss out on commercial opportunities in Puteoli. To preserve the relationship and opportunity to do business in the future, they tried to find an agreeable solution which did not harm reputations. Secondly, group punishment is facilitated by the presence of a shared socio-cultural framework, a standard set of common norms and beliefs to which the members were likely to adhere. This condition can explain the frequent use of oaths by Jupiter and the emperor, which were completely irrelevant for the enforcement of contracts but identified cheaters as social outlaws, failing to respect divine and Roman power. The threat of religious sanction could easily isolate a cheater who had pledged an oath by a deity and consequently failed to fulfil his obligations. Thirdly, information on individuals and their reputation needs to flow freely within the community, for members must be able to identify untrustworthy colleagues. When the costs of generating and communicating information on reputation are too high, private-order ostracism and enforcement can never work properly.¹⁰⁷ Nevertheless, this barely seems to be an issue for the Sulpicii and their colleagues. First, the presence of attesting witnesses, both the people officially signing the documents and mere spectators and passers-by frequenting Puteoli's commercial space, eased the spread of information. Alternative, more informal

¹⁰⁵ See Greif (1989; 1993) for late medieval trade in the Mediterranean; Gelderblom (2011) for the Low Countries during the Middle Ages; and Clay (1997a; 1997b) for nineteenth-century Mexican California.

¹⁰⁶ North (1991). ¹⁰⁷ Milgrom, North, and Weingast (1990).

channels, such as gossip in the forum, in the *basilica*, or during assemblies of professional associations no doubt assisted in communicating the latest news on the reputation of businessmen. *Collegia* in particular were able to gather facts on previous transactions and businessmen's reputations, as each member contributed to a common pool of information and benefited from the assembled knowledge.¹⁰⁸ Finally, one should not underestimate the importance of strong kinship and dependency ties among resident businessmen in diffusing information. We have already noted that the judges mentioned in the tablets usually belonged to local Campanian families with large interests in commerce, and that people who were most likely related to them appear in other tablets of the archive. The picture emerging from this prosopographical evidence is thus one of a close-knit community of businessmen, in which information on members' reputation could easily circulate.

We can even take the argument one step further and argue that this private-order reputation mechanism not only operated within the Puteolan society, but also influenced other, non-local business connections. As Puteoli was home to a large community of foreign merchants, all rooted in their own network, news about someone's trustworthiness may have travelled along these links to other harbours and commercial hubs. Moreover, it is well known that Campanian families did not restrict their business interests to the Italian peninsula, but engaged in trade all over the Mediterranean and beyond. The most famous example evidently is the *gens* Annia, whose members invested in business in Egypt and India.¹⁰⁹ These connections too may have stimulated the diffusion of information on merchants' reputations to areas well beyond the Bay of Naples.

CONCLUSION

The previous sections argued that, although Roman law offered very sophisticated solutions for most commercial conflicts, in practice the usefulness of the *actiones* seems to have been rather limited. Roman law somehow failed to put into effect the obligations implied by private contracts, because of the lack of a policing power to enforce decisions. Businessmen obviously had the opportunity to take a fraudulent partner to court, but actually receiving compensation remained their own responsibility. The analysis of the Sulpicii archive thus clearly suggests that the threat of legal action and actually taking an opponent to court was rarely the first line of defence against opportunistic behaviour. To reduce uncertainty and prevent fraud, Roman businessmen

¹⁰⁸ For the economic importance of *collegia*, see Broekaert (2011).

¹⁰⁹ Camodeca (1979); Bonsangue (2001).

relied on a private-order reputational control mechanism to counterbalance shortcomings in legal development and the lack of guaranteed enforcement. This control system allowed for an increase in the effectiveness of contract enforcement, so that gains from cooperation outweighed the gains from cheating. Businessmen were well aware of the fact that cultivating and preserving long-term reputational control systems was often far more important than obtaining a one-time profit. The face-to-face business community supported by wide-ranging networks thus provided a personalized social-order enforcement mechanism which, to a certain degree, guaranteed honesty: the threat of being excluded from this community was simply too dangerous.¹¹⁰

This is obviously not to say that Roman law was a mere fictional, academic exercise with no practical importance, or that the gap between norm and practice was too large to be bridged. Law defined the rights, obligations, and liability of all parties involved in the transaction, establishing the norm under which trade should be conducted. Law offered a standardized set of formulae and agreements, increasing general understanding of contract law and saving merchants precious time when drafting contracts. Law also deterred people from theft and fraud, by providing rules in case of non-compliance and violation, by identifying the correct legal action and punishment in case of infringements. Law provided rules to deal with unexpected problems such as damages and loss of merchandise, shipwreck, and jettison. One thus cannot doubt the importance of a coherent legal system to reduce transaction costs, but it is equally important to accept the shortcomings of Roman law, which legal historians have sometimes failed to do. It is true that one-third of the tablets are related to litigation and that the Sulpicii clearly did sue their opponents. It is equally true that the language of the documents follows Roman law and procedure.¹¹¹ Nevertheless, one should recognize that litigation *pur sang* seems to have been a final resort, the procedure to follow when all previous actions had failed, and that, even in court, a combination of reputational control systems and private enforcement dominated the course of justice. It thus seems very difficult to accept that 'Historical circumstances had set the use of formal law (...) directly on a path to becoming the default system.'¹¹²

In conclusion, the archive of the Sulpicii shows Roman law neither as a theoretical construct with no practical corollary nor as a perfect tool in finding compensation. As long as law in practice was sufficiently flexible and adaptive to the needs of commerce, for instance by allowing private arbitration and the free choice of a judge, and was supported by reputation mechanisms in a face-to-face business community, conflicts may have been dealt with in an informal and presumably relatively efficient way. Law as a formal rule is hence supplemented with informal rules of reputation, disciplinary pressure,

¹¹⁰ North (1991).

¹¹¹ Terpstra (2013: 15–30).

¹¹² Terpstra (2013: 49).

and enforcement by peers. Even though the body of Roman law in theory allowed an increasing depersonalization of business, one cannot write off the ever-continuing role of personalized contacts and networks.

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Part V

Discussion

Pompeii Revisited

Willem Jongman

No ancient site has captured the imagination more than Pompeii. First, of course, there is the story of its tragic end, and images of Sodom and Gomorrah that went with it. More important for an age that lacked modern 3-D animation, there was the sensation of unmediated access to the past. You could walk through the streets, and imagine you were actually walking through the ancient city. And that, of course, is still what modern tourist guides try to peddle to modern visitors: the idea that all you have to do is come and see. Understanding what you see is easy. This is then accompanied by a string of comparisons between past and present: look, they are/were just like us. If only writing history were quite so easy. And yet the appeal of the site is undeniable because it opens our eyes to an altogether different antiquity from that of the literary sources.

Perhaps the most important historian to be seduced by Pompeii was a young Michael Rostovtzeff. As a student he visited Pompeii, and wrote a dissertation on it.¹ It was that visit that sensitized him to the opportunities offered by archaeology for a new historiography of the classical world. Just as the older Rostovtzeff was guided by his experience of the Russian Revolution, the younger Rostovtzeff was marked by his visit to Pompeii. His model of Roman society and his model of the Roman economy were decisively shaped by what he saw in Pompeii or by what he thought he saw. He was impressed by the wealth and comfort of Pompeii's inhabitants and equated such inhabitants to those of his own day.² To us that may seem absurd, but if we look at it in the perspective of his time this was not so crazy. Contemporary Italy still only had one leg in the modern world, and the same applied even more strongly to czarist Russia.

¹ Andreau (1988); Mau (1893) for a contemporary interpretation of what the young Rostovtzeff would have seen.

² Rostovtzeff (1957: 142–3).

His explanation for such achievement was in the efforts of the municipal commercial bourgeoisie. Again, this shows him to be a child of his times. That explanation reveals his analytical weakness, but the thick archaeological description in his work marked the historiographical revolution. With Rostovtzeff's take on Pompeii, we have, I think, the two major themes for our discussion: the first is that of an assessment of the town's economic performance, and the second is that of possible explanations, many of which have been social and cultural rather than economic. Rostovtzeff's modernist, if you will, model of the Roman economy was only challenged from the 1960s by an altogether different kind of historian: Moses Finley.³ Thick description and inductive positivism were not for him. Instead, he offered a conceptually sophisticated alternative form of analysis. Like many historians of his time, he had come to realize the fundamental difference between the past and the, by now, far more modern present. The past was a strange land, with different norms and values, and different conditions.⁴ The gap between the pre-industrial world and our modern one was enormous, both culturally and morally, and also economically. In fact, for Finley, the Greco-Roman world was so fundamentally different that in his view modern tools for social analysis, such as modern economics, were of little value to understand a society that did not, he believed, respond to market mechanisms. It was a position with quite an ancestry, ultimately going back to the nineteenth-century German historical school in economics, with its rejection of liberal market economics.⁵

It was also a deeply pessimistic vision of antiquity as a world where the mass of the population was living at or near subsistence, and where the wealth that there was was that of a relatively small landowner elite. Unlike the medieval aristocracy, these Roman land owners lived in the cities. They were an urban elite, but not entrepreneurs in trade and industry. They even shied away from involvement in trade and industry, motivated by an overriding rentier culture of disdain for disreputable trades. Thus, the market remained relatively unimportant in the ancient economy. Thus also, there was no economic growth, allowing Finley freely to mix anecdotes from archaic Greece, late antiquity, or anything in between. Roman economic history was all about structure, and not about change. And the explanation of that underdeveloped structure was ultimately a cultural one.

For urban history Finley also made an important contribution.⁶ Since ancient cities in the majority were cities with relatively small-scale trading and manufacturing sectors, and were dominated by the landowning elite, they did not contribute to the dynamic division of labour between town and country that was to be so beneficial in modern times. Instead, cities were

³ Finley (1985).

⁵ Jongman (1988).

⁴ See e.g. Laslett (1965).

⁶ Finley (1977).

parasitic, living off agricultural rents. This was the historiographic situation in the 1970s and 1980s, with lively discussion on the level of market integration and monetization, the volume of long-distance trade, economic mentality, the composition of urban elites, and the basis of the economy.⁷

Interestingly, much of this debate actually bypassed Pompeii. Pompeian archaeology had not exactly flourished intellectually under the Fascist regime and post-war parochialism, and the same applied to its unique epigraphy. This changed with the publication of Paavo Castrén's sceptical prosopography of the city, and Jean Andreau's magisterial study of the archive of L. Caecilius Iucundus.⁸ Between them, they, and some prodding from Harry Pleket and Moses Finley, encouraged me to bring Pompeii back into the debate as it was then.⁹ Quite a few of my own substantive reconstructions were more in the primitivist mode, with one important proviso. Then and now I disagreed with Finley on methodological grounds. I think his rejection of modern economic theory was a serious intellectual mistake in that it failed to appreciate what modern economic theory really presupposes. Incidentally, this rejection of economics was gladly shared by Finley's modernist critics, but probably more from laziness than conviction. So instead I tried to come up with an economic model that could explain the lack of development and the low standard of living in Pompeii. It was a classic model of response to population pressure (population density was undeniably very high), with changing proportions of factors of production, and a declining marginal labour productivity. Such involution explains the rise of the dominant class of landowners, parasitic town-country relations, the nature and dimensions of social inequality, social mobility, and the exercise of political power. In terms of explanation, it turned the Finley model on its head.

What it did not do, probably because I could not possibly imagine how one could ever do it, was to attempt to investigate empirically what the city's economic performance actually was. With Finley, I simply assumed we knew life in Pompeii was brutish and short. All we needed to do was to find explanations—which is where we differed fundamentally. Remarkably, we were not alone in ignoring economic performance. Finley's modernist critics believed there had been more trade and more elite involvement, but never came up with an alternative discourse on standard of living or growth, let alone with any empirical validation.

And that is precisely what I have tried to do in recent years, and what I think we should really do for Pompeii as well.¹⁰ This is not to say that that is easy. The most obvious way to do this is to look at per capita incomes and their purchasing power. This is what real economic historians do, and it is what Bob

⁷ See e.g. Crawford (1970); Frederiksen (1975); Garnsey, Hopkins, and Whittaker (1983).

⁸ Andreau (1974); Castrén (1975). ⁹ Jongman (1988).

¹⁰ Jongman (2007a; 2007b; 2014a; 2014b).

Allen recently did with the wages and prices of the Price Edict.¹¹ As a first fix this is very useful, because it places Roman antiquity firmly in the range of other pre-industrial societies. Ancient Rome was not nearly as prosperous as the modern world, and only compares with other economies from before the Industrial Revolution. It is important to keep that in mind as a first benchmark, but no more. Allen's comparative research has demonstrated that the bandwidth of pre-industrial prosperity can be pretty wide, with the Netherlands and England, in the seventeenth and eighteenth centuries, not surprisingly at the top. Conceptually, such a wide bandwidth is important because it demonstrates that life before the Industrial Revolution was not uniformly bleak and at the margin of subsistence. Societies could, and did, escape extreme poverty. Therefore, the research question is not just how societies could affect the transition to modern economic growth such as from the Industrial Revolution, but also what made some pre-industrial societies more prosperous than others.

The classic explanation for such differences is the Malthusian model, where prosperity invites procreation, which in turn eats away the previous gains.¹² If we rephrase Malthus in modern economic terms, the problem for pre-industrial economies is that of declining marginal labour productivity. Put twice as many workers on a piece of land, and they will not produce twice as much, but less than that. Their labour productivity has declined, and therefore their labour incomes. Thus, pre-industrial economic history is often viewed as a seesaw between rising populations suffering declining labour incomes, followed by famines and epidemics, the Malthusian positive checks, which made room for higher marginal labour productivity and therefore higher labour incomes. This is the scenario I had in mind when I looked at Pompeii over twenty-five years ago. We know Roman society was characterized by high population density: certainly so in Italy and most of all Campania. Hence my pessimistic reconstruction of a society dominated by a relatively small and very rich landowning elite, and a mass of other people who were living not much above subsistence.

So the research question should be: Was there an escape from Malthus? This is hotly debated in early modern economic history, with, for example, Gregory Clark's *A Farewell to Alms* as a pessimistic denial.¹³ In Allen's comparison, Diocletianic Rome is somewhere in the middle, not with the top performers like the Netherlands or England on the eve of the Industrial Revolution, but not with the bleak tail end of (often) Asian economies either. However, Diocletianic Rome was well after the period of Rome's greatest prosperity, so the question remains: How well Rome did do at its best?

¹¹ Allen (2009).

¹² McCants (2015).

¹³ Clark (2007).

Koenraad Verboven elegantly uses Pompeian data on wages and prices for this in Chapter 12, and his conclusion is that these suggest per capita incomes there were a few times subsistence. That suggests that my own pessimism may have been wrong. However, such conclusions must remain tentative because the data really are too few, as with all Roman wage and price data.

For the last decade I have therefore taken an altogether different tack, and tried to harness large archaeological datasets, with Keith Hopkins' shipwreck graph as my inspiration.¹⁴ The weakness of nearly all such datasets is that they do not allow absolute measurement, but only a relative measurement compared to periods before and after. The good news is, of course, that economic growth is indeed a process that happens over time. So if consumption is twice as large in period t as it was in period t_{-1} , then we know people in period t were not living at subsistence. And this is indeed what recent scholarship has shown.¹⁵ The shape of that shipwreck graph returns in just about every time series of data on Roman settlement and population, or production and consumption.¹⁶ The Roman economy was not one where nothing ever changed, and where escape from Malthus was impossible. From the late fourth and early third century BC, the number of rural sites in Italy began to grow significantly, and so did the size and complexity of those sites. The same happened with urban demography.¹⁷ The number and size of cities started to grow, and this is also quite visible in Pompeii. But were these people also more prosperous? As a first shot, and with the help of Jan Jacobs, the econometrician in our team, and with Nettuno survey data generously made available by Peter Attema and his team, I have used the shape of the demographic trend to deflate find numbers for fine wares and *amphorae* to get a per capita trend for the Nettuno region (Figure 14.1). I think the graphs speak for themselves: population pressure did not depress standard of living. One would almost say: 'on the contrary'.

For Pompeianists, such time series inevitably are frustrating. They do not have data for the late second-century AD decline, and the Republican data are not quite the same as those from the eruption strata. When I wrote my book on a Pompeii and a static Roman world that never escaped from Malthus, this did not seem to matter so much, but now that we have all these fascinating time series it suddenly does, I am afraid.

So what else do we have on the standard of living in this volume, apart from Koenraad Verboven's price data in Chapter 12? First, there are Estelle Lazer's fascinating data on the biological standard of living in Chapter 5. Skeletal data are a hugely promising source for human history as we actually study the humans themselves: you are what you have done, what you have eaten, and what you have suffered. Techniques are rapidly advancing, but practice in the

¹⁴ See Hopkins (1980), and now Wilson (2011).

¹⁶ Jongman (2007a; 2007b; 2014a; 2014b).

¹⁵ Jongman (2016).

¹⁷ Sewell and Witcher (2015).

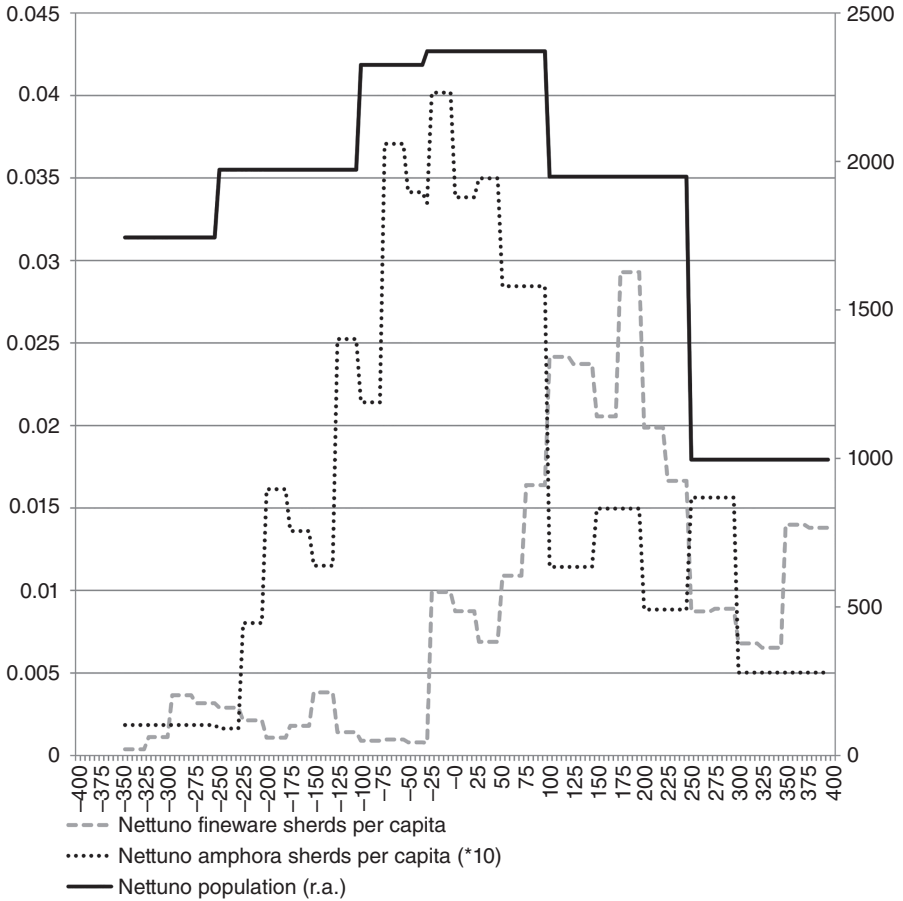


Figure 14.1 Population and per capita consumption in the Nettuno survey area. (Jongman, 2014b: 82; data from De Haas, Tol, and Attema, 2011).

field is often different, with incomplete recording or even destruction of the material. Pompeii has not been different in this respect, but there is some material, and Lazer has tried to make the best of it. The results are not particularly dramatic. Pompeians were much shorter than modern people, about as tall as other inhabitants of Roman Italy, and slightly shorter than their ancestors or medieval descendants. That comparison shows the nature of this indicator that reflects not only prosperity and diet, but also the disease environment. That Pompeians were not any taller was, therefore, probably the product of an unhealthy disease environment, due to high population densities in both town and countryside. For a proper understanding of these results we probably have to wait for the wider context of such data from the rest of the empire. But that is on its way.

Erica Rowan's probing of the Herculaneum sewer in Chapter 4 gives more direct information on diet, and I find the results impressive: the diet was rich and varied, and reflected a pretty prosperous lifestyle, and not just for the happy few. Now this is not a unique result. Two of my students, Douwe Visser and Frits Heinrich, have looked at the archaeobotanical data for diet from Britain and the Netherlands, and in both cases Roman rule coincided with a much better and more varied diet than before or after.

Finally, there are two chapters on the decoration and content of Pompeian houses. Nick Ray's study of the contents of a set of Pompeian houses in Chapter 3 suggests lifestyles that were well above subsistence. But then, these houses are not exactly hovels, and may hide big inequality among those living inside them.¹⁸ Domenico Esposito's study of the organization of painters' workshops, and of the demand for their work, in Chapter 9 suggests that painting was indeed pretty big business, and organized to match. Here, I am still eagerly awaiting the equivalent of Ad van der Woude's reconstruction of the volume of Dutch painting in the seventeenth century.¹⁹ These chapters all deal directly with the important question of standard of living. I think they suggest, and Chapter 4 in particular, a standard of living for many that was higher than I imagined twenty-eight years ago. But the results are also surprisingly and disappointingly tentative, in that not that much has been done to answer this fundamental question: How prosperous were Pompeians? Admittedly there is a methodological problem, because absolute measurement is often impossible apart from the far-from-unequivocal data on biological standard of living. Elsewhere in Roman society, the most successful research strategy for this has been relative measurement of changes over time. I have argued elsewhere that the strongest argument in favour of a more optimistic assessment of Roman standard of living in late Republican and early Imperial Rome is the stunning similarity between the trends in shipwrecks, fish-processing facilities, wine presses, meat consumption, fine ware consumption, and so on.²⁰ Sadly, we do not have such data for Pompeii, and I think this is precisely why Pompeii may no longer be the ideal case study for the currently dominant research interest in economic growth and decline. That is a process that happens over time, and this is where Pompeii lets us down.

The other contributions are principally important because they may provide explanations for this tentative prosperity. A few chapters briefly touch on economic mentality. This, of course, has been the Finleyan explanation for stagnation, but, more strongly than ever, I believe that this cultural turn has been a red herring. I think modern economic theory is a perfectly suitable analytical tool. This is not to say that cultural preferences are unimportant, but

¹⁸ Cf. Mayer (2012). ¹⁹ Van der Woude (1991); Prak (2010).

²⁰ Jongman (2007a; 2007b; 2014a; 2014b); cf. data series presented in Wilson (2006) and Marzano (2013).

they then are utilities to be maximized. As long as the resources to satisfy them are scarce, an economic problem remains.

As for institutional explanations, we have the important group of chapters on money, credit, and contract enforcement (Chapters 10–13). In the Finley model, a lack of monetization and underdeveloped institutions were seen as both reflections of an underdeveloped market economy and impediments to economic growth. I think, between them, these chapters conclusively show that Pompeii was not undermonetized at all, and enjoyed a working mix of formal and informal arrangements to enforce contracts and to lower transaction costs. With the risk of sounding ungrateful to Richard Hobbs for all his important results in Chapter 11, I would be interested to see more of the context for the chronological pattern of increasing monetization. Did it lag behind the growth and development of the *insula*, as he seems to suggest? Finally, I want to briefly pause to ponder the importance of these financial institutions of coinage, credit, and contracts. Do they explain Roman economic growth, as some would seem to argue? My tentative answer is probably negative. They greatly helped, of course, but if one looks at the chronology of such institutions, they seem to have evolved in response to, and following on from an earlier growth and development. We need more work in this field, though not particularly at Pompeii, of course.

The next group of chapters I would like to discuss is that on urban manufacturing and retail trade (Chapters 6, 7, 8, and 10). In a sense, this was the focus of the primitivist–modernist debate, and we find quite a few implicit echoes of that debate in these chapters. I like sceptics, and Nicolas Monteix (in Chapter 7) proved a good specimen. On the other hand, data never are good, and compared to other sites Pompeii can be heaven. I think the strategic question is that of ‘good enough for what?’ What is the question that needs to be answered, and how good do the data need to be?

If I understand Eric Poehler’s GIS model for the analysis of movement correctly (in Chapter 6), this is a model that aggregates optimum navigation between a multitude of possible trips that could be made. These could then be used to explain the location of customer-intensive economic activities such as shops or bars. In Chapters 8 and 10 respectively, Damian Robinson and Steven Ellis both take us to earlier periods, and that is important. The chronology of Pompeian urban growth and manufacturing is part of a much larger trend in Italy, of population growth from the late fourth/early third century BC, of urbanization, and of increasing production and consumption of non-staple food and manufactured goods. I agree with Damian Robinson that it would be surprising if the rich did not apply the same sharp sense for a good deal in urban business that they showed in agriculture. The architectural integration of business premises in even grand residences is a strong argument.

I was impressed by the analytical potential of Miko Flohr’s construction of the dataset of buildings in Chapter 2, and I want to draw out two implications.

The first is more social than economic, and relates to the nature of social stratification. Flohr is perfectly right to see a continuous spectrum, but that is what any frequency distribution is likely to show. The central issue is the demarcation of 'elite' and the extent to which dimensions of status overlap or not. With regard to a formal elite, Pompeii probably had an *ordo decurionum* of a hundred members. They had to be rich and of free birth. However, if we look at the housing stock, the number of large and respectable atrium houses is much larger, some 500 to 600 if we include an estimate for the unexcavated parts of the city. So who were these other 400 to 500 people who were rich enough to buy such expensive properties, and adopt a matching lifestyle? Here we have the middling group that Scheidel and Friesen struggled to find.²¹ And, interestingly, for all we know the vast majority of them were probably freedman, just as the vast majority of the 500 to 600 people in the pool from which the banker and auctioneer L. Caecilius Lucundus recruited his witnesses were also freedmen.²² Furthermore, of the witnesses whose homes we know, nearly all lived in precisely such grand houses. So there was a large sub-elite of mostly libertine status, and it was a big group indeed, encompassing perhaps a quarter of the urban population. They were cared for by a domestic staff of at least equal numbers, but I think more. Interestingly, there are very few small proper houses. What we have below this group is mostly shops and workshops, where presumably many workers lived as well. My second observation concerns numbers of people rather than numbers of houses. Even in Flohr's (in my opinion) too-conservative estimate for domestic staff, domestic service is the most numerous type of occupation in the town. Workshops were a minority.

This then invites a question about the basis of the town's economy. I think we should not altogether abandon the idea of the consumer city, but that we should also look at agriculture and to De Simone's excellent Chapter 1 in particular: it may well contain the key: specialization in highly profitable market crops.

Flohr's reconstruction of aggregate supply and demand for food was a quite pessimistic one, and, to some extent, matched my own. He is more pessimistic than me in that he gives Pompeii a smaller territory, and thus a lower carrying capacity, but more optimistic because he uses a very high, and I think unrealistic, estimate for cereal yields. That shows the uncertainty surrounding all this, but in the end, we are in the same ballpark.

So we have come a long way. In the end, Pompeii was far more prosperous, and this prosperity did reach down to much lower strata than I, at least, once thought. Equally, the growth that there had been seems to have been the product of a successful answer to the challenges of population pressure. What was achieved was a high-level equilibrium, but a pre-industrial one.

²¹ Scheidel and Friesen (2009). Cf. Mayer (2012).

²² Jongman (1988).

In terms of research strategy for economic history, unfortunately Pompeii is no longer the ideal case study, I am afraid. It may not be a perfect time capsule, but equally its contribution to time series analysis of large archaeological datasets will probably remain limited. As for a wish list for future research, I would first love to see more on standard of living and empirical data on prosperity. Second, I think that we need more on agriculture, and perhaps from archaeological science in particular.

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Index

- ager Campanus* 32, 69
ager Pompeianus 33, 40, 368, 370
 agriculture 3, 6, 7, 23–51, 68–71, 81, 127–8,
 243, 253, 424–6
 agronomists 244–5, 260
 Allison, P. 6, 92–4, 210
 Andreau, J. 297, 309, 380, 409
 arboriculture 34, 43–6
argentarii 343, 356, 366, 371 n. 49, 373,
 376–81, 383, 400, 401
 Asia Minor 346, 365, 398, 405
assis (as) 342–3, 351–2, 367, 369, 373 n. 60
 halved 320 n. 94, 351–2
 atrium 15, 56, 58, 67 n. 30, 68, 75, 166, 227,
 228, 250, 252, 265, 266 n. 11, 268 n. 18,
 277–8, 283, 315, 342, 374
 atrium house 4 n. 12, 8, 14, 54, 73, 92, 167,
 173, 198, 250, 300, 425
aureus 341, 366 n. 14, 367–8, 373–4, 382

 bakers 125, 128, 233–4
 bakeries 14, 58 n. 14, 112, 119, 120 fig. 4.2,
 125, 127, 128, 201, 213, 216, 217,
 218–19 fig. 7.2, 223–4, 226, 233–4, 253,
 255, 256, 264–6
 bankers see *argentarii*
 bar 14, 166, 167, 192–3, 196–7, 217, 248,
 256–7, 306, 319, 341, 343, 345, 347,
 358–60, 367, 369, 375
 barley 43–4, 115, 117, 126
 Bay of Naples 5, 9, 11–12, 13, 15, 81–2, 106,
 112, 115, 117, 123–4, 125, 127, 357,
 363–5, 371–2, 381, 387, 389, 404,
 405, 409
 Beloch, J. 31 n. 16, 54, 68
 Boscoreale 29–30, 112
 Villa della Pisanella 29–30, 36–8
 hoard 368, 372 n. 52
 Villa di Popidius Florus 29–30,
 33 n. 27, 38
 Villa Regina 36–8
 bounded rationality 90
 bronze 92, 95–9, 101, 102, 215, 217, 226, 228
 bullion 356, 365, 382
 business communities 364–5, 371, 377–8,
 387–411

 Caecilius Iucundus, L. 343, 371, 376–7,
 380–1, 419, 425
 Campanian black slip ware 357

 Capua 5, 31, 33–4, 351, 366 n. 14, 402,
 405 n. 99
 carrying capacity 41, 46, 55, 69, 425
 cash 305, 341, 365, 368, 371, 372, 374–8,
 380–2
 Cato 34, 36, 39, 114, 244, 250, 343–4, 376 n. 79
caupona 217
cella vinaria [wine cellar] 35–7
 ceramics 92–9, 104, 124, 215, 222
 cereals 9, 41–3, 69, 114–16, 117, 119 n. 50,
 123, 125, 127–9, 425
 chicken 118, 121, 128, 253
 Cicero 243–5, 255, 364–5, 368 n. 27, 397, 399,
 406
 coins 11–12, 293–327, 339–60, 363–74, 382–3,
 394
 afterlife 11, 318–22, 326
 bronze 249, 316, 319 n. 86, 321 n. 96,
 342–3, 346, 349–50, 352, 353, 356, 357,
 363–4, 366–8, 372–3
 circulation 12, 296, 299, 318, 320 n. 94,
 321 n. 96, 326, 340–1, 346, 351–3, 356,
 366–8, 370
 imitations 12, 347, 349–52
 loss 11, 297, 300, 302, 305–11, 313, 315,
 318–19, 321, 323, 324, 326, 345,
 359–60
 Republican coins 12, 320 n. 95, 321 n. 96,
 323, 341, 343–4, 347, 351–4
 stray coins 87, 296, 307, 367
 supply 323, 353, 356, 365–7, 370
 coin finds 11, 87, 293–327, 340, 363, 366,
 367–8, 373
collegia 409
 Columella 28, 30, 34–9, 244
 commercial conflicts 387–411
 commodity mode 364, 381
 construction activity 211–12, 224, 248, 253–6,
 272–3, 312–19, 321–6
 consumerism 10, 91, 104
 consumers 87–106, 119–22, 128–9, 369, 380
 consumption 2, 9–10, 13, 15, 40–2, 55, 69, 71,
 75–80, 82, 87–106, 111, 116–22, 128,
 197, 249, 263, 370 n. 36, 421–4
 conspicuous 88–90, 258
 correspondence analysis 98–101, 103, 364
 counter 166, 196, 217–19, 222–3, 245, 256,
 257 fig. 8.5, 293, 319, 341, 360
 countryside 15, 23–48, 53, 55, 68–71, 128,
 244–5, 422

- currency 12, 339, 341, 347, 350, 363–83
 current accounts 379–81
 Curtis, R. 7
 credit 12, 14, 323, 356, 375–81, 383, 388, 391, 405, 424
curatores restituendae Campaniae 212

 dates (fruit) 43 n. 77, 115, 118, 119 n. 50, 125–6
 debt 364–5, 371–81, 382, 383, 390, 391, 393, 396–7
denarius 212 n. 16, 342–4, 372–4
 dental health 136, 141–2, 152
 deposit banking 379–81
 depositional processes 93–4, 121, 298–9, 303, 308
 Digest 373, 379–80, 382
 DISH 148–9, 152
dolia 28, 35, 37–8, 40 n. 64, 112, 217–19, 223
dulciarius 217

 earthquake, AD 62/63 7, 141, 167, 210–13, 246–7, 253–4, 259 n. 50, 273, 282–3, 294, 322–5, 360
 Ebusus 12, 307 n. 48, 346–58
 economic change 7, 126–8
 Edict of Diocletian 89, 264, 420
 eggshells 112, 121, 266
 Egypt 41 n. 66, 63, 116, 118, 128, 357, 364, 382, 395 n. 37, 409
 grain fleet 15, 116
 elite houses 4, 15, 73–80, 166, 250, 254, 281–2, 373
 estate sizes 28–30, 35–8
 excavation 5–6, 11–12, 37, 53–4, 60, 72, 92–3, 103, 111, 120, 126, 135–7, 139, 143, 167, 182, 202–3, 212–15, 224 n. 50, 231, 232, 243 n. 4, 245, 247, 249, 266, 268, 273–4, 294–5, 297–300, 302, 305–8, 311–16, 318, 320 n. 92, 321, 325–6, 342, 345, 359, 367

 fiduciary coinage 342, 356, 363, 366
 Finley, M. 1–2, 209, 418–19, 424
 fish 13, 69, 115, 118–27, 129, 166–7, 204, 253, 360
 bones 111–12, 221
 otoliths 112, 124
 salting 13–15, 120, 167, 218–19, 221, 249, 253–4, 360, 404, 423
 sauce 14–15, 124–5, 127
 Fiorelli, G. 53–4, 57, 64, 214 fig. 7.1, 217
 fishing 13, 115, 123–5
 food 111–29
 production 114–16, 123–6, 128
 retail 167, 197, 216, 252, 254

 forum 4, 13, 170, 175, 177–8, 182, 190–1, 196, 201–3, 266 n. 11, 397, 401–2, 409
 Frank, T. 6–7
 fraud 379 n. 94, 392, 409–10
 freedmen 15, 34, 63, 125, 167, 243–4, 246–8, 259, 365, 371, 372 n. 54, 376 n. 79, 377, 390–1, 398, 404, 406, 425
 fruit cultivation 46, 115–16, 128–9, 244
 fulling 220, 223
fullonicae 14, 167, 231, 371

garum 6–7, 124–5, 253 *see also* fish sauce
 Gini-coefficient 75
 glass 92, 95–100, 104, 215
 grain 23, 35, 40–2, 48, 71, 81, 111, 114–16, 118, 125, 127–8, 316–17, 369, 396

 health 135–54
 Herculaneum 2, 5, 10, 14–15, 31, 33, 39, 41 n. 66, 44, 46, 55, 56 n. 12, 69, 73, 81, 111–29, 139–140, 144–5, 147, 149, 151, 153, 167 n. 6, 210 n. 7, 211, 216, 225, 231, 232 n. 72, 233, 243, 245, 248, 267–8, 284, 296 n. 8, 325 n. 115, 365, 367, 371–3, 375–6, 403, 405 n. 99, 423
 Cardo V sewer 111–29
 skeletons 139–40, 211
 Villa of the Papyri 41, 268–9
 horses 228, 233, 234 fig. 7.7, 349–50, 352
 household lists 369–70, 327
 houses 8, 11, 30, 42, 55–68, 72–80, 92–5, 99, 100, 103–6, 122, 124, 127, 137, 166, 173, 192–3, 196, 201, 227–8, 233, 244–6, 250, 252, 254–5, 259, 263, 266–71, 276, 278, 281–5, 293, 300, 307, 309, 312, 315, 317, 324–5, 345, 365, 368, 374, 401, 423, 425
 see also elite houses
 hyperostosis frontalis interna 142, 150–1

 imports 13, 42, 116, 127–8, 356
 coins 346–7, 356
 food 42, 120
 India 118, 125, 127, 129, 364 n. 3, 409
 inequality 54–5, 64, 71–80, 419, 423
 internal account rationing 364, 381–2
 iron-working 226

 Jashemski, W. F. 7, 32, 36–7
 Jongman, W. v. 1–3, 6–7, 9, 12, 32, 35–6, 54–5, 68–9, 81, 153, 221, 417–26

 land 4, 24–48, 56–7, 60–1, 69–71, 81–2, 92, 114–15, 119, 122, 125, 167, 218, 244, 253, 260, 345, 371, 420
 lease 371, 391
 prices 57, 92
 use 32–47, 60–1, 167

- lanificariae* 14, 220–1
 Laurence, R. 7–8, 10, 168–71, 173, 175, 178–9, 185, 190, 192, 203, 221 fig. 7.3, 247, 258–9
 law 377–9, 388–96, 398, 406, 409–11
 enforcement 387–411
 Leach, E. 283–4
 lead-working 216, 226
Lex de Gallia Cisalpina 366
Lex de parieti faciendo 272
Lex Iulia de vi privata 393
Lex Irnitana 403
 lifestyle 9, 74, 77–9, 90, 102–4, 423, 425
 goods 103–4
 litigation 389–410
 local currency 350
 luxuries 15, 55, 100–4, 369
- Maiuri, A. 7, 137, 167, 210, 214, fig. 7.1, 246, 267
 Malthusian limits 420–1
 Massalia 12, 307 n. 48, 346–57
 Mayeske, B.-J. 7, 217
 merchants 127, 274, 357, 376, 387–411
 metal-working 226
 millet 43–4, 114, 117, 121, 126
 Moeller, W. 7, 221 fig. 7.3
 monetization 14, 249, 321–3, 326, 363–4, 419, 424
 money 2, 11–12, 55, 81, 119, 167, 245, 253, 255, 259–60, 323, 339, 341, 343–4, 363–83, 390, 396, 401, 406–7, 424
 money-changers *see argentarii*
 Monte Somma 23–6, 28–9
 movement 163–204
 Murecine (Moregine) 5, 366, 371, 394
 Edificio dei Triclini 274–5, 278–9, 283
 Murecine tablets *see* Sulpicii archive
- Naples (Neapolis) 5, 9, 27, 31–4, 39, 41–2, 81, 112, 210 n. 7, 213–15, 273
negotiatores 404, 406
 network analysis 163–204
 Nissen, H. 54, 68
 Nola 5, 9, 13, 27, 31–2, 34, 39, 41–2, 47, 69, 81–2, 376
 Nuceria 5, 13, 31, 69, 81, 210 n. 7
nummularii 366
- olives 40, 43–4, 69, 112–17, 126, 128, 234, 371
 olive oil 40, 112, 114, 116, 120, 123, 125, 128–9
 Oplontis 44–6, 114, 266 n. 11, 341–2, 368
ordo decurionum 425
 osteophytic change 142, 144, 147–9
- Pagus Augustus Felix Suburbanus 71
 painting 11, 79–80, 211, 220, 263–86, 341–2, 358, 423
 Vettii workshop 277–85
 Via Castricio workshop 280–5
 palaeodemography 152
 panel pictures 79–80, 264–73, 277–81, 382 n. 104
pastio villatica 253
 Paul (jurist) 366
 pepper, black 118–19, 121–2, 125–6, 129
 peristyle 56, 60, 67–8, 75, 77–9, 166, 173, 250–2, 254–5, 275, 277, 345
pictores 263–6, 272, 274
plebs media 369–70
 Pompeii *passim*.
 House I 5, 2 (tannery) 220
 House I 6, 8–9 92
 House I 7, 19 92, 103
 House I 8, 6 281
 House I 8, 14 227–9
 House I 9, 9 220 n. 36, 266
 House I 10, 8 92
 House I 11, 17 268, 281
 House I 14, 2 228 n. 62
 House II 8, 6 268
 House VI 6, 17.20–1 58
 House VI 8, 20–21.2 58, 223
 Building VI 17, 1–4 255
 Shop VII 2, 44 342
 House VII 14, 5.17–19 58
 House VIII 2, 17–21 283 n. 76
 House VIII 7, 10 (tannery) 221
 House IX 7, 24–5 342, 369, 370
 Casa dell'Adone Ferito (VI 7, 18) 283 n. 76
 Casa degli Amanti (I 10, 11) 92, 103
 Casa di Amarantus (I 9, 11–12) 111, 117, 122, 126, 127
 Casa degli Amorini Dorati (VI 16, 7.38) 283 n. 76
 Casa dell'Ara Massima (VI 16, 15) 283 n. 76
 Casa di Arianna (VII 4, 31.51) 279, 283 n. 76
 Casa del Bracciale d'Oro (VI 17, 42) 212, 275, 278, 279, 284
 Casa della Caccia Antica (VII 4, 48) 279, 283 n. 76
 Casa dei Casti Amanti 42
 Casa dei Ceii (I 6, 15) 65
 Casa del Centenario (IX 8, 3.6) 283 n. 76
 Casa del Chirurgo (VI 1, 9–10) 247–8, 309, 325, 345, 359
 Casa dei Dioscuri (VI 9, 6–9) 275 n. 40, 278–81, 283 n. 75, 284, 367 n. 24
 Casa dell'Efebo (I 7, 10–12.19) 60, 92, 281

Pompeii (*cont.*)

- Casa di Fabius Rufus (VII 16, 20) 65,
73 n. 46, 279 n. 50, 280 n. 56, 283
- Casa del Fabbro (I 10, 7) 92, 103, 227
- Casa del Fauno (VI 12, 2) 65–7, 73, 171,
173, 190, 192, 246, 252
- Casa della Fontana Piccola (VI 8, 23–4)
279, 283 n. 76
- Casa di Gavius Rufus (VII 2, 16) 279
- Casa di Julius Polybius (IX 13, 1–3) 92, 94,
103, 282 n. 68, 283 n. 72, 285 n. 83
- Casa del Labirinto (VI 11, 8–10) 253, 255
- Casa di M. Lucretius Fronto (V 4, a.1)
277 n. 45, 281 n. 60, 282 n. 68
- Casa del Marinaio (VII 15, 1–2) 202
- Casa del Menandro (I 10, 4) 92, 94–6,
99, 103, 106, 249 n. 25, 281, 282,
285 n. 83, 282
- Casa del Naviglio (VI 10, 11) 4 n. 12, 279,
283 n. 76
- Casa di Octavius Quartio (II 2, 2) 275 n. 40,
278 n. 50, 282 n. 68, 285 n. 83
- Casa della Parete Nera (VII 4, 59)
279 n. 50, 283 n. 76
- Casa delle Pareti Rosse (VIII 5, 37) 279,
283 n. 75
- Casa di Pinaris Cerialis (III 4, b)
278–9 n. 50, 283 n. 76, 285 n. 83
- Casa dei Pittori al Lavoro (IX 12, 9) 268,
270–1, 275–6, 277, 279 n. 50, 280 n. 56,
285 n. 83
- Casa del Principe di Napoli (VI 15, 8) 65
- Casa dei Quadretti Teatrali (I 6, 11)
92, 103
- Casa della Regina Carolina (VIII 3, 14)
265, 283
- Casa del Sacello Iliaco (I 6, 4) 268
- Casa del Sacerdos Amandus (I 7, 7) 92
- Casa di Sallustius (VI 2, 1–5) 255,
313 n. 71, 325
- Casa degli Scienziati (VI 14, 43) 4 n. 12
- Casa di Stallius Eros (I 6, 13) 92
- Casa di P. Vedius Siricus (VII 1, 25.47)
59–60, 283
- Casa della Venere in Bikini (I 11, 6) 92,
94, 281 n. 60
- Casa delle Vestali (VI 1, 7) 11, 122, 124,
127, 247–59, 309, 315, 345, 359
- Casa di L. Vetutius Placidus (I 8, 8–9)
319 n. 86, 343, 367, 369
- Casa dei Vettii (VI 15, 1) 277–80, 283,
285 n. 83
- Commercial 'Triangle' (VI 1, 14–18.20–21)
248–9, 254–6
- Forum 4, 13, 170, 175, 177–8, 182, 190–1,
196, 201–3
- Forum Baths 182 n. 45

- Macellum (VII 9, 7) 14, 182 n. 45, 278–9,
281 n. 62, 283–4, 369
- Stabian Baths (VII 1, 10) 281 n. 62
- Suburban Baths 60
- Temple of Apollo (VII 7, 31) 186, 188, 198,
203, 344
- Temple of Isis (VIII 7, 28) 259, 273–4,
278 n. 50, 279, 281, 283–4, 358
- Temple of Dionysus (San Abbondonio) 344
- Thermopolium of Asellina (IX 11, 2)
223, 231
- Villa of Diomedes 282
- Villa of the Mysteries 61, 282
- Pompeii premise 315
- popina* 217
- population 2, 9–10, 13–15, 23, 27, 30–2,
39–42, 53–69, 71–5, 77, 79, 81–2, 89,
92, 94–6, 104–6, 115–16, 127, 135–7,
140–3, 145, 150, 152–3, 191, 198–200,
367, 370, 418–22, 424–5
- estimates 13, 30–2, 40, 53–68, 310
- density 27, 68
- pressure 419–21, 425
- porotic hyperostosis 142, 146–7
- Porta Stabia Project 112, 294, 299–302,
345 n. 19
- post-eruption disturbances 93, 212–13, 216,
367 n. 24
- prices 38–9, 47–8, 57, 87–9, 92, 129, 167,
342–3, 369, 372–3, 388, 420–1
- private account rationing 376–7, 379
- professional associations 409
- property market 231–3
- publican 365
- Puteoli 2, 5, 12, 15, 41 n. 66, 47, 106, 116–17,
129, 244–5, 255, 272, 274, 364–6,
370–1, 379, 381, 387–9, 394, 398–402,
404–9
- basilica* 400
- chalcidica* 400
- Horrea Bassiana 116
- Temple of Serapis 272
- quadrantes* 351, 369, 373
- quality of life 9–10, 87–162, 423
- recycling 231, 319 n. 87
- retail 2, 6, 8–11, 14, 39, 55, 72 n. 43, 105,
167, 175, 185, 196–7, 215–16, 222 n.
40, 223, 252, 254, 293–4, 299–300,
308–9, 323–6, 376, 424
- Augustan retail boom 294, 323–5
- retail landscape 252, 293–4,
325–6
- Richardson, L. Jr. 278–80
- Rostovtzeff, M. 417–18
- rubbish 316–19

- sale credit 375–6, 383
salve lucrum 259
 Sarno 4, 24, 47, 61, 69, 71, 123
 sacrificing 90, 98, 101
 Scafati 42, 60 n. 22, 71 n. 40, 114
 Villa Vesuvio 42, 114
 Scheidel, W. 75, 80, 152–3, 425
 Schefold, K. 211
 seashells 112
 seismic activity 4, 141, 211–12, 235, 273, 282,
 360, 367
sestertius 343–4, 367–82, 396, 403, 405
 shops 8, 11, 13–15, 55, 56, 61, 63, 65, 67–8, 72,
 112, 119–20, 170 n. 17, 182 n. 45, 185,
 192–3, 196, 198, 201, 209, 216–17,
 218–19 fig. 7.2, 222–4, 231, 243–8,
 252–4, 255, 256, 259, 285, 293–4,
 299–300, 305–13, 319, 320 n. 94, 323–5,
 342, 360, 368, 369, 371, 375, 424–5
 silver 92, 95–9, 106, 215, 365, 369, 382
 coins 212 n. 16, 307 n. 48, 310 fig. 10.4, 321,
 341–4, 366–7, 368 n. 27, 371–3, 382
 skeletal remains 10, 117, 129, 135–53, 369,
 421–2
 slaves 15, 40, 55, 63, 93, 104, 119 n. 49, 125,
 127, 173, 244, 248, 259, 365, 369, 371,
 373, 376 n. 79, 378–81, 390–1, 398
 cost of 369, 371
 imperial 365, 371, 379 n. 94
 small change 14, 249, 306, 352–7, 360, 368–9
societas 379, 390, 405
 spinning 225
 Stabiae 34 n. 36, 44–5, 60, 69, 81 n. 56, 275 n.
 40, 279 n. 50, 296 n. 8, 367
 Villa di Carmiano 279 n. 50
 Villa di San Marco 275 n. 40
 stature 89, 136, 140–3, 152
 streets 10, 13, 116, 163–204, 256–7, 417
 suburbs 31, 60–1, 68
 Suessa 343–4
 Sullan colony 4, 141 n. 24, 259
 Sullan siege 344, 354–5
 Sulpicii archive 5, 12, 116, 274, 343, 363–81,
 387–411
 sumptuary laws 106
système technique 11, 233–5

 tanneries 6, 14, 218–19 fig. 7.2, 220–1, 226
 textile production v, 6–7, 14, 81–2, 216, 220,
 223–6, 235
 Terzigno 29–30
 Cava Ranieri 29–30, 38

thermopolium 217
 Thiessen polygons 29, 69–70, 81
 trade 2–3, 7–9, 11–12, 15, 48, 81–2, 112,
 123, 125–6, 149, 243–6, 253, 323,
 355–7, 360, 364–5, 371, 377, 379,
 387, 391, 398, 400, 404–5, 408–10,
 418–19, 424
 maritime 377, 379, 387, 391
 traders 12, 82, 105, 247, 254, 300, 346, 356,
 371, 379
 trauma 136, 139, 142, 143–7, 149
 trust networks 377, 383

 Umbricius Scaurus, A. 14–15, 124–5

vadimonium 392, 396, 402–4, 411
 Varro 34, 253–4, 255
 Veblen 88, 101
 vessels 9, 88, 92–100, 102, 104–5, 222–3, 266,
 319 n. 86, 357
 Vesuvius 2, 4–5, 23–30, 32–5, 37–40, 43,
 46–8, 112, 114, 129, 137, 150, 211,
 368, 387
 AD 79 eruption 2, 4, 24, 41, 43, 47 n. 86, 93,
 94, 112, 137, 139, 150, 153, 211, 368,
 387, 212–13
 villa 4–5, 13–14, 27–30, 37, 38–41, 61, 73, 75,
 81–2, 111, 114, 116, 127, 212, 244,
 250–4, 282, 368
 Villa of San Rocco, Francolise 250–3
 Vindolanda 372–3
 viticulture 5, 14, 35, 38–9, 41, 81 n. 55,
 115 n. 21

 Wallace-Hadrill, A. 7–8, 54–8, 62, 65, 166,
 210 n. 6, 246, 284–5
 waste 127, 299, 306, 312–13, 315–18, 326
 weaving 223–5
 wheat 43–4, 48, 69, 114, 116, 117, 126,
 369 nn. 33–4
 wine 9, 13, 15, 30, 33, 35–40, 42, 48, 69, 81, 97,
 112, 114–16, 119–20, 123, 125, 127–9,
 218–19 fig. 7.2, 226, 257, 342–3, 356–8,
 370, 372 n. 59, 376, 423
 Falernian 342
 see also viticulture
 workshops v, 8, 11, 14–15, 56, 60, 105, 119,
 122, 127, 198, 201, 209, 216–24, 226,
 228–31, 233–4, 243–6, 248–50, 252,
 254–5, 257–9, 263, 265–6, 274–8,
 280–2, 284–6, 306, 309, 345, 360, 365,
 423, 425